

MR. TYPEWRITER

PUBLICATIONS BY THE SAME AUTHOR

*Essential Qualifications of Leaders and Teachers
in Adult Education*, 1935
Typhoid on Tap, 1943
Of the Virgin Born, 1947
Art Bronze Turns Twenty-Six, 1948
Twelve Months Hath a Year, 1949
Service Printery, Danville, Pa.



CHRISTOPHER LATHAM SHOLES, MILWAUKEE, WISCONSIN.
EDITOR, PUBLISHER, LEGISLATOR. PRINCIPAL INVENTOR OF
THE PRACTICAL TYPEWRITER, 1866-1873.

MR. TYPEWRITER

A BIOGRAPHY
OF
CHRISTOPHER LATHAM SHOLES
BY
ARTHUR TOYE FOULKE

"There is properly no history, only biography"
—Emerson



THE CHRISTOPHER PUBLISHING HOUSE
BOSTON 20, U.S.A.

Z 49
A 18.54

COPYRIGHT © 1961
BY THE CHRISTOPHER PUBLISHING HOUSE

Library of Congress Catalog Card Number 61-9665

PRINTED IN THE UNITED STATES OF AMERICA

To

my loving and lovable family I affectionately dedicate
this, my sixth, book:

ARTHUR HUGHES FOULKE

The late MARY BRIDGET TOYE FOULKE

The late MARY HAZEL FOULKE

A. MADELINE FOULKE DENTON

FRANCES ELISABETH FOULKE RILEY

RUTH MARY FOULKE

RALPH TOYE FOULKE

The characters and incidents portrayed in this story are not fictional; any similarity, therefore, as between facts and people herein and those you may have known is purely intentional, because all are true and real.

CONTENTS

<i>Chapter</i>		<i>Page</i>
I.	First, Why?	25
II.	Prelude	31
III.	Sholes Born in Loghouse	34
IV.	Typewriter No Longer a Curiosity	41
V.	The Typewriter to Sholes' Day	50
VI.	Will Sholes Succeed?	57
VII.	Character of Sholes	62
VIII.	Down to Cases	66
IX.	Danger! Women at Work	76
X.	There've Been Some Changes Made	95
XI.	Dvorak Simplified Keyboard	104
XII.	The U.S. Leads in Manufacture	110
XIII.	Sholes Dies of Tuberculosis	118
XIV.	Postlude	124

LIST OF ILLUSTRATIONS

Christopher Latham Sholes	Frontispiece
First working model of the typewriter	17
Second working model	18
One of Remington's model No. 1 without stand	19
Sholes from oil portrait representing him in later life	20
Christopher at work	21
Dvorak-Standard keyboards	22
Dirt-road entrance to Mooresburg, Pa.	23
Main Street, Mooresburg, Pa.	24
Mrs. Charles L. Fortier	89
Lillian Sholes, the first typist	90
Photographic reproduction of a water-color portrait of the author	91
Photographic reproduction of an oil painting of part of the "Sholes Farm"	92
Photograph of the artist	93
John Pratt's "Pterotype"	94
Streamlined typewriters of tomorrow	95
"The typewriter will render obsolete the schoolroom copy-book. . ."	96
The birthplace of the typewriter	97
Print of the one-letter Sholes experimental model	98
Miss Stella Pajunas	99

HIGHLIGHTS IN THE CHRONOLOGY
OF THE
WRITING MACHINE
 (1714-1938)

	<i>Date</i>	<i>Invention and/or Development</i>	<i>Country</i>	<i>Inventor or Manufacturer</i>
	January 7,	"Writing Machine"	England	Henry Mill
10	July 23,	For embossing printed characters for the blind "Typographer"; "Burt's Family Letter Press"; first typewriter capable of practical work	France	L'Hermina
	1829		America	William A. Burt
	1833	Typebars converged at center. "Kryptographic Machine or Pen"	France	Xavier Projean (Progin)
	1843 (1849?)	"Raphigraphy"	France	Pierre Foucault (Foucauld)
	1845	"Patent Printer"; "Mechanical Chirographer," ("Chirographic"); "Writing Machine"; platen	America	Charles Thurber
	1845	Connected pencil, traces letters	America	—
	1850	Double hand impression machine	America	—

1850	No name	America	Oliver T. Eddy
1850	—	America	J. B. Fairbanks
1852	“Mechanical Typographer”	America	J. M. Jones
1854	“Typograph”	America	R. S. Thomas
June 24,	“Printing Instrument for the Blind”; typebars converge at center	America	Alfred Ely Beach
1856	Typewheel principle	America	J. H. Cooper
1857	“Printing Machine”; four rows of keys in peg form; inked ribbon	America	Dr. Samuel William Francis
1858 (1854?)	“Improved Mechanical Typographer”	America	Henry Harger
1863	“Improved Mechanical Typographer or Printing Apparatus”	America	F. A. deMay
1863	“Improved Hand Printing Device or Mechanical Typewriter”	America	Benjamin Livermore
1864	—	Austria	Mitterhofer
1866	“Machine for Writing and Printing”	America	Abner Peeler
1866	“Pterotype”; first practical typewriter of the typewheel class	America	John Pratt

Highlights of the Chronology Continued

	<i>Date</i>	<i>Invention and/or Development</i>	<i>Country</i>	<i>Inventor or Manufacturer</i>
July ?, Autumn,	1867	First experimental, one-letter model	America	C. L. Sholes
	1867	First working model "type-writer"	America	Christopher L. Sholes
	1867	"Machine for Writing with Type or Printing on Paper or Other Substance"	America	Thomas Hall
	1868	Movable type plate and hammer	America	—
June 23,	1868	"Type-writer" (capitals only)	America	Christopher L. Sholes
	1870-75	"Writing Ball"; Example radial-striking-plunger class	England-America	R. J. M. Hansen
	1872	Spring-seated keys carry type	America	—
	1874	First commercial typewriter (Wrote capital letters only.)	America	Remington and Glidden
	1876	Remington No. 1 model—capitals only	America	Remington
	1878	Model 2 Remington (Wrote capital and small letters for first time—by shift key and platen shift.)	America	Remington
About 1878	(1883)	"Caligraph" (Wrote capital and small letters for first time with its first full keyboard ever made.)	America	Yost-Wagner

1878	Type on ends lever	America	—
1881	Elastic type plate	America	—
1884	Oscillating type segment and hammer	America	—
1890	First portable typewriter (Ideal keyboard.)	America	Geo. C. Blickensderfer
1896	Ford typewriter. First practical machine of radial-striking-bar class.	—	—
1896	First automatic ribbon reverse	America	Remington
September, 1896	First "noiseless" typewriter (U.S.A. patent No. 567,241)	America	W. P. Kidder-C. C. Colby
1920	First Standard keyboard portable	America	Remington
1924	Noiseless Consolidated Standard keyboard embodied and introduced worldwide	America	Remington
1931	Noiseless portable	America	Remington Rand (changed in 1927 from Remington)
1937	First short stroke Standard typewriter	America	Remington Rand
December, 1938	Model 17	America	Remington Rand

CHRISTOPHER SHOLES FAMILY TREE

FATHER—Orrin Sholes

MOTHER—Catherine Cook

BROTHER—Charles C. Sholes

Christopher Latham Sholes
(1819-1890)

WIFE —Mary Jane McKinney (1821-1888)

Children of Christopher L. and Mary Jane Sholes

Infant ()

Bess (Mrs. Eliz. Gilmore)
(-1939)

Cass (-1926)

Budd (-1894)

Jessie (Miss)
(-1898)

Catherine (Mrs. Terral)
(-1896)

Charles C. (-1902)

Louis (-1914)

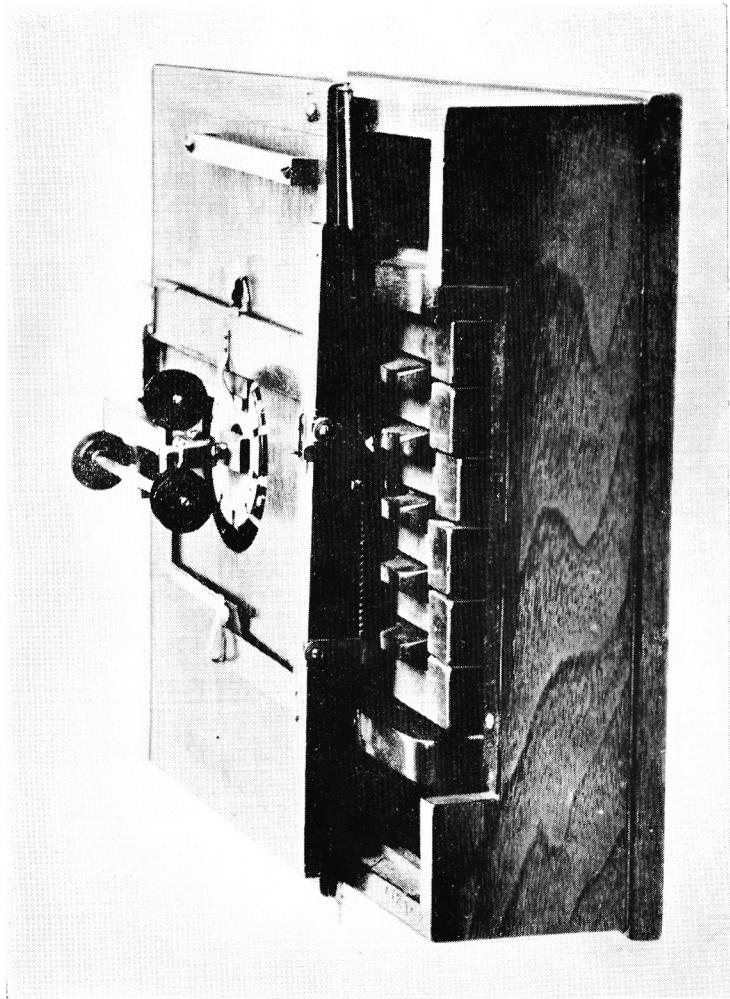
Fred (-1935)

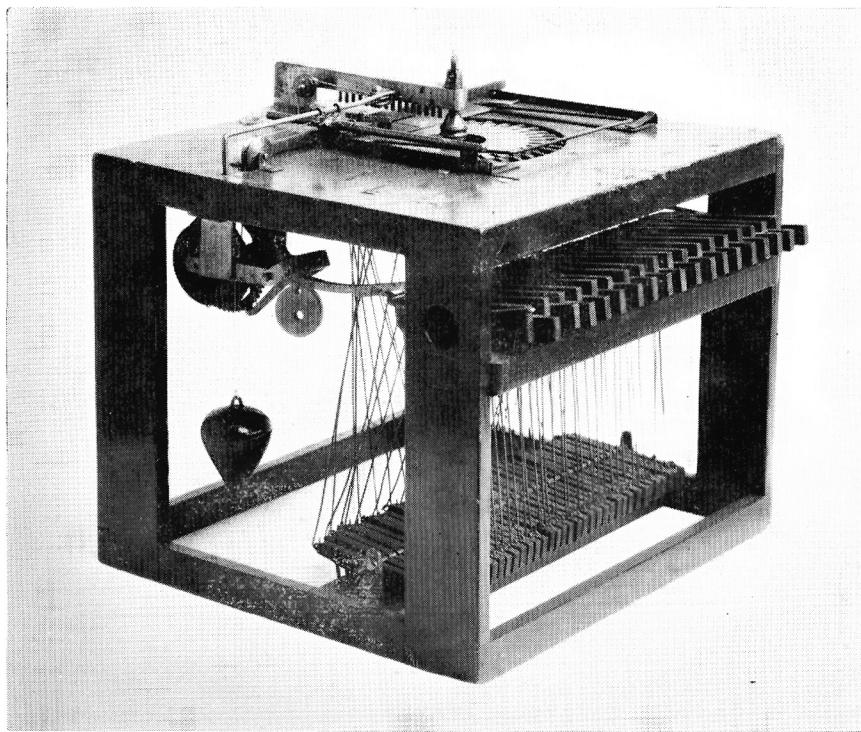
Zalmon G. (-1917)

Infant ()

Lillian (Mrs. C. L. Fortier)
(1856-1941)

FIRST WORKING MODEL OF THE TYPEWRITER, JUNE 23, 1868
Sholes, Glidden, and Soule

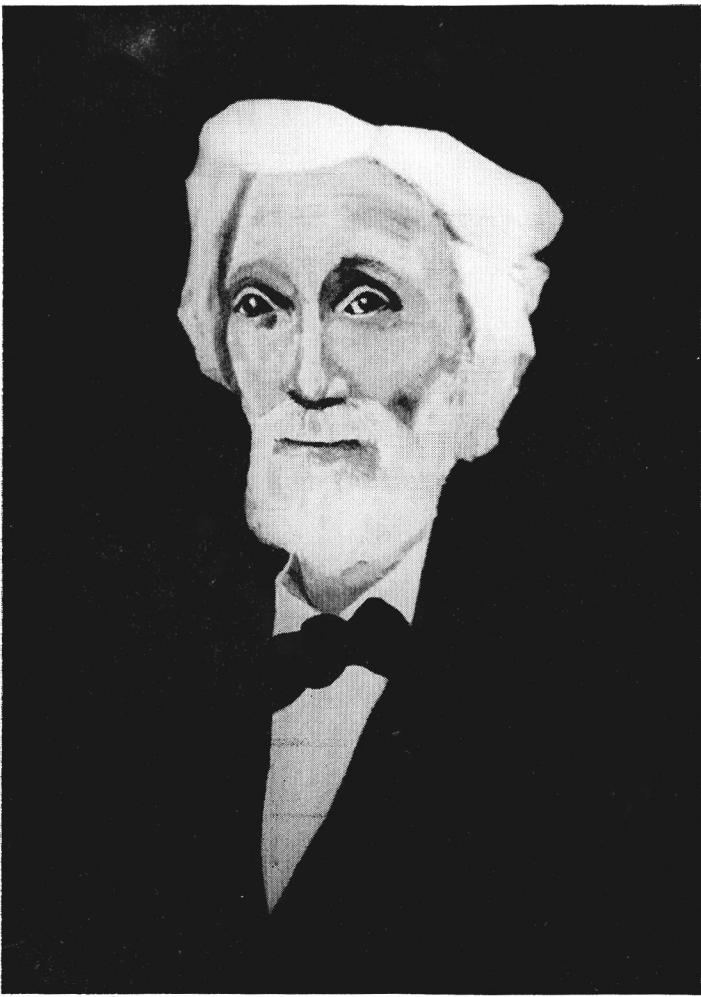




SECOND WORKING MODEL, JULY 14, 1868
Sholes, Glidden and Soulé. *Photograph from U.S. National Museum.*



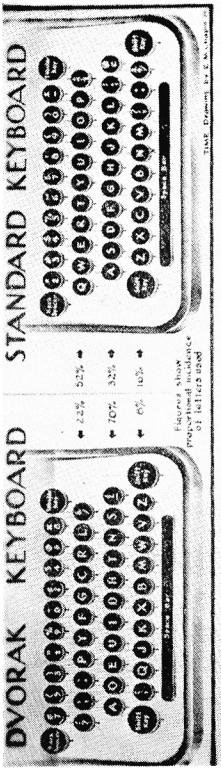
ONE OF REMINGTON'S MODEL NO. 1 WITHOUT STAND, 1873
Photograph from U.S. National Museum.



SHOLES FROM OIL PORTRAIT REPRESENTING HIM IN LATER LIFE, BY RALPH TOYE FOULKE. ORIGINAL HANGS IN THOMAS BEAVER LIBRARY, DANVILLE.



Christopher Latham Sholes, inventor of the typewriter, at work on one of his experimental machines
(1872)



© TIME, Inc., 1939

DVORAK-STANDARD KEYBOARDS

Time magazine drawing by R.N. Chapin, Jr., courtesy of Time,
copyright Time, Inc., 1939.



DIRT-ROAD ENTRANCE TO MOORESBURG, PA., ON WHICH THE YOUNG MAN
SHOLES UNDOUBTEDLY TRAVELED MANY TIMES - AS IT APPEARED OCTOBER
31, 1943.

Photograph by the author.



MAIN STREET, MOORESBURG, PA., AS IT APPEARED OCTOBER 31, 1943
Photograph by the author.

Mr. Typewriter

BY

ARTHUR TOYE FOULKE

Chapter I

FIRST, WHY?

Why Sholes (Shōlz) and his typewriter aren't as well known as Fulton and the steamboat or Whitney and the cotton gin is hard to understand. But of course, whereas the stories of the latter are to be found in elementary readers and history books, sufficient facts about the former are not.

One thick junior-high American history, for example, printed as late as 1938 has one reference with one sentence of exactly sixteen words on the subject. Sholes and his important contribution to mankind are conspicuously absent! And the name or work of any other typewriter inventor the same. A 1,496-page encyclopedia revised August, 1942 contains not a word on Sholes or the typewriter.

There IS a bare—and incorrect—mention in F. B. Warren's *Can You Answer This One?* (1927), a book of questions and answers. The question is, "Who was the inventor of the typewriter?" But the answer says, "F. E. Sholes"! *World History* (1942) revised edition, by Hayes, Moon, and Wayland, New York: The Macmillan Company, hasn't a word in its 920 pages. Beards' *Basic History of the United States* (1944), New York: Doubleday, Doran & Company

on page 293 states cryptically, "1868—C. L. Sholes' typewriter ready for production."

Again, a well known weekly magazine newspaper has for twenty years maintained that John Pratt's "Pterotype" was Sholes' first patented machine. *Writer's Digest* for June, 1944, page fifty-one, under the caption of "An Idea A Day," stated "The typewriter was patented on August 26, 1868."

It was actually on June 23rd of that year.

In his *Pennsylvania Governmental Volume*, Frederic A. Godcharles claims a patent was issued to Sholes June 23, 1869 and that his original invention was patented December 1, 1866. In his *Chronicles of Central Pennsylvania* he said, "... He (Sholes) received his patent on the first practical machine built by him in March, 1873..." As a matter of fact, March 1, 1873 was the date a contract was signed with Remington for manufacture. *The Home and School Reference Work* said the construction and perfection of the 1874 machine were due to "Charles" L. Sholes, etc.

What IS true of such an important subject as this should once and for all be publicized.

Maybe these negligent, careless historians and writers might argue that any treatment would in justice require extensive treatment because the story doesn't start or end with Sholes, and there's such a thing as space limitations. Others even had a hand in "midwifing" HIS old "contraption".

Or they could say that always there existed no compilation of the known and unknown from which to prepare even a ready summary. But certainly treatment there should be. We hope the following satisfies this felt need.

Adults without the foundational knowledge of the school-room had little source material to turn to. There was some; we located forty-six-odd references (see bibliography). All

but two, which were unavailable, were used for source material.

But the information was scattered, incomplete. There was need for it to be collected—and much increased, co-ordinated, and integrated — into one complete volume.

John W. Vrooman, himself a student of the typewriter, and president of the Herkimer (N.Y.) County Historical Society in 1923, has said: "On the personal side much more could be written concerning Sholes, for he was a man of very unusual and attractive character . . ."

Information on Sholes, then, has been limited. He is largely unknown. Concerning what existed prior to this work, usually emphasis seemed placed on the evolution of the writing machine rather than on Sholes' importance and his personal life and work, which we proposed to do.

However, this was done as available material permitted. It was not due to the distortion of the facts — to the exclusion of the origin and important milestones in the typewriter's development, all in an attempt to produce an authentic, well rounded picture. For this is the story of the making of the typewriter — the whole story. But HIS machine was the truly great success, his was the first practical, saleable writing machine. Sholes' typewriter clicked!

This personal information was hard to find. Such unknown or little known facts as are herein contained had to be dug in most cases not from the usual wellsprings, but from those which proximity to a great inventor's birthplace provide: surviving relatives, old people, including those who knew Charles Lyman Sholes; descendants of that man's friends, deeds, Mooresburg residents and natives, cemeteries, etc.

Additionally, the kind and generous cooperation of many others who had important facts to offer is hereby graciously

acknowledged. They include Isabel C. Schoch, James and Harold A. Dieterick, Charles and Frank Diehl, Mr. and Mrs. Charles C. Hale, Dr. August Dvorak, Gertrude C. Ford, Mrs. Helen B. Bryan, grand-niece of the inventor; Carl P. Dietz, M. C. Wittenberg, J. E. Graf, the Rev. L. K. Sholes, Sr., Hebert Sholes, William C. Bruce, William George Bruce, and Mrs. Irene M. Wergin. Also, there were countless letters, both written and received.

In the meager information that did exist, sometimes Christopher Latham Sholes was referred to as a Milwaukeean. But long before that he was a Danvillian and a Montour countian, for not till eighteen did he leave for the West. And when a local boy makes good, it has always been the source of great satisfaction to the folks back home. I am one of those folks.

One instance of the importance of his work is the fact a million typewriters were needed for constant use in the U.S. Army alone daily in World War II. In the Navy, they were in the service of practically everything afloat. Every bomber had one aboard, each battleship of the active squadrons fifty-nine, each aircraft carrier fifty-five.

The demand for the typewriter which only total war necessitated, and the desire to give to its inventor his rightful, if overlooked or unrecognized, place in world history combined to lift from confounding obscurity the name of Christopher Sholes and his altogether too little known story; and to have been the first to knit it into one literary garment was a thrill comparable to managing a "scoop" on the rival newspaper.

An expression of the typewriter's importance and far-reaching benefits to the business, industrial, civilian, and military world was once stated in a Remington Company advertisement as follows:

"The first practical typewriter was destined to revolutionize business, free the world from pen slavery, and complete the economic emancipation of womankind. No other machine, no other invention, no other article of commerce of any kind has ever played a more commanding rôle in the shaping of business and social destiny."

Christopher Sholes emancipated women from the drudgery that is housework and was ever afterward glad. ". . . I do feel," he said, "that I have done something for the women who have always had to work so hard. . . ."

The world should know more about the history of his weapon of peace and war, and of his life in general; so, as the song says . . . "I'm not a great poet, but this much I know" . . . Sholes rhymes with the typewriter!

The following, as we have said, is a factual chronicle. Our procedure was to strive always to employ the science and research of the historian in finding the facts, and his imagination and art to make clear their significance for, as G. M. Trevelyan in *History of England* indicated, in history it is the truth about the men who walked the earth, the fact about the past, that awakens interest and holds it.

The history of a place, I believe Carlyle said, is the story of the men who lived there. Men of consequence who live, work. This is an account of various men who toyed with the idea of a typewriter, but particularly of one who doggedly experimented until at last it became a practical reality.

We sought to write a thorough and complete and scholarly and informative and interesting literary work in story-like narrative form that would present Sholes to the world for who and what he was and gave. Because he lived in a free America he could first think of, then think out, an idea and then unobstructed, become the great, if yet too little

known, American inventor of the indispensable typewriter, an American invention.

To distinguish him from the animal, God made man after His own image and likeness, and endowed him with intellect and the power of speech, spoken and written. The typewriter gave rapid and unmistakable clarity to the latter.

We desired to answer the news w's: the who, what, where, when, why, and how of the typewriter and its inventor; in short, to compile for the first time an illustrated, authoritative reference work that would make unnecessary another.

Chapter II

PRELUDE

In the fall of 1867 — the exact day appears lost to posterity — the first working model of the typewriter, weapon of war or peace, was built by a native of Montour county, Pennsylvania, who then “hunted and pecked” out on the “contraption” the first typed letter ever written.

One of the first civilians to go to World War II, the typewriter had to celebrate its 75th, 76th, and 77th anniversaries (1942, 1943, and 1944) — in the midst of the second global, catastrophic war within a generation — wherever it found itself — on land, afloat, or under the sea, or in the air — without any diminution of its very full work schedule.

The chief producer — the “father” — of that priceless invention, one Christopher Latham Sholes, was a Jack-of-six-trades. He was also a master of six: printer, editor, publisher, journalist, inventor, legislator. Humanity received of him the first practical, saleable typewriter.

Called the world’s most unknown inventor, and chief of all the unsung heroes, Sholes got only \$12,000 for the device that was to endow all users with legibility and through constant practice, great speed. That sum, the first and last cent he was ever to receive, was the price of the royalty right bought by dignified, authoritative James Densmore, a Meadville, Pennsylvania editor, printer, publisher, and successful oil man to whom the first typewritten message — a “sales letter” — was addressed.

Judy's magazine, quoting a business circular issued by Badger Paper Mills in Wisconsin, states this sum was received from the Remington officials for manufacturing rights. When they offered a lump sum Sholes was simply financially unable to resist, and so accepted. Densmore, it goes on to say, less in need of cash, asked for royalty arrangement, during his lifetime collected \$1,500,000.

Whichever, it wasn't much for a priceless invention; still it was something. Besides, the name of "type-writer" which Sholes gave to his machine has lasted to this day, though now spelled without the hyphen.

In his own simple, direct way, and for the first time since 1714, he hit upon a thoroughly descriptive and satisfactory name, and no one has ever been able to improve it. The christening took place between July, 1867 and January, 1868.

However, it could have been called the "Sholes" type-writer. For even his partners regarded him as the real inventor. Hadn't he himself solved the final problem? Hadn't he even typed the first letter after the first working model had been finished! He had accomplished a lot for his forty-seven years. And probably not one in ten thousand — even in America — knows his name!

The extremely crude, experimental first model, mounted on a whittled-out pine wood base and consisting of a sheet of glass and other odds and ends, printed only the letter "w" over and over again by means of a single key resembling a Morse telegraph transmitter. But it printed the "w", cut in brass, in sequence as fast as the key could be operated.

Before some gentlemen, including Charles E. Weller, famous court reporter, from whom the day before he had borrowed a sheet of carbon paper; Carlos Glidden (Glid'-n) and Samuel Soulé (Soola'; Soo'-lá), his associates, Sholes

slipped the carbon and a thin sheet of white paper into his mechanism against the piece of glass, moved the paper slowly with one hand, tapped with the other. This original model became lost and years later Weller made one from memory.

Even the first working model had innumerable defects. However, it *wrote accurately and rapidly*. Remington Rand's *The History of the Typewriter* states that one day in September 1867 Sholes, with a group of admirers circled about him, sat down at this machine, wrote this line: "C. Latham Sholes, September, 1867."

Some present felt this new mechanism was mightier than the pen whose delineations are slow and faulty at best! One of those persons must have been Sholes, for from that day he seems to have discarded the pen entirely. He even typed his signature. Writing on his "instrument" fascinated him; he wrote "hundreds" of letters to all his friends and acquaintances. All Sholes models were restricted to capital letters.

Here indeed was revolutionary departure from convention. Sholes, with ready intuition, saw its revolutionary possibilities. For several thousand years writing was done the hard way—with a sharp point, first with sticks on the ground; then, sharpened quills in dyed water; next, metal points dipped in ink.

Of course the pen wasn't useless just because the typewriter now put in its appearance. But never could it equal the precision or speed of the new mechanical typewriter. So though its history (which is another story) went on, its prestige would never again be as great. Overnight, the typewriter liberated people from sole dependency upon the slavish — sluggish — use of the pen.

Chapter III

SHOLES BORN IN LOGHOUSE

On that St. Valentine's Day in 1819 when the Sholesses announced from their airy log farmhouse near the quiet village of Mooresburg in Montour county, Pa., state highway route number 45, the arrival of a new boy and said they were calling him Christopher Latham, the weather was bitter. But then that wasn't unusual for these parts where winters were long, the cold penetrating, snows deep.

These parts were historic, too, because Mooresburg, four miles northwest of Danville, the county seat, was laid out by Stephen Moore (probably "Moor" originally) in 1806. In May, 1947 a Pennsylvania state historical commission placed a marker at the southeastern limits.

That cellarless loghouse, and about 100 acres of wood and cleared land, came into the possession August 7, 1880 of one Charles Diehl, Sr. in payment for a \$700 or \$800 loan. Charles Lyman Sholess (relationship to Christopher unknown but believed to be a nephew) had occupied and owned it.

It was eighteen feet square, a story and a half, possessing a steep, ladder-like staircase and four windows. A wooden lock on its front door didn't shut out rural loneliness but it did anyone bent on stealing.

And the cracks between the logs were as so many telescopes magnifying the sky, even if they did also admit the snow, on long winter nights. Sometimes they had to shake it off the bedding before crawling out into the unheated morning. Still, all kept very well. The lad doubtless derived

delight in lying on his wooden bunk and crackling straw tick and gazing long hours at the stars . . . and dreaming.

In time, Diehl's increasing family made it necessary to build to this. He, however, razed it about 1891 right after he had completed a new frame dwelling adjoining. Later he bought more land, some of which extended to the "Devil's Featherbed" (in Northumberland county, Point township). The frame house, incidentally, was destroyed by a chimney fire in December, 1923.

A dreamer, then, was Christopher even as a child. Said to be a lineal descendant of John Alden and Priscilla Mullens from his maternal grandfather, and other hardy New England stock; and son of Cabinet Maker Orrin Sholes and Catherine Cook, he had an attractive personality: he seemed to have and hold all the good virtues: gentleness, simplicity, culture, modesty, unselfishness, kindliness, lovable ness, generosity, ingenuity, wisdom, agreeableness.

According to their number, variety, and scope, he should long be remembered — on the authority of Editor Myra Ewing (*Harrison Abrasive Magazine* — Vol. 1, No. 4) who said: ". . . The enduring history of man will not be of his inventions, but of his virtues."

See if you can't find some of these reflected in the portrait study done of him in February, 1943 by the Danville, Pa. artist Ralph Toye Foulke. It hangs in Thomas Beaver Library there and a copy is used as an illustration in this book. (Foulke presented Sholes' birthplace painting, also reproduced herein, to the Danville museum.)

Sholes liked to cook and his recipe for ginger bread, which proved to be unavailable for reprint here as was planned, wasn't bad, they say. Old residents say Charles Lyman was a cook too, so maybe it was HIS recipe they were talking about.

His ancestors, who came from England, settled in Groton, Connecticut and several are said to have served with distinction in the Revolutionary War. Thereafter his family probably came down the old Indian trails of Wyoming Valley from Connecticut to settle in Pennsylvania.

As a farm boy near Mooresburg his days were likely no more eventful or romantic than many another called upon to do chores before and since. In the village one-room school he was forced painfully to scrawl his full signature which, pronounced slowly with the full rolling vowels, sounded impressive.

"But to write it was tedium. It took long," he complained. "It was a waste of time."

Indeed, the time and effort required to write the twenty-three letters of his name no doubt helped to inspire a shorter, mechanical way. Patience, you notice, isn't listed among the virtues said to belong to him. Nevertheless, one can well imagine his having been a "well respected pupil" and as such to have received, as did one of his relatives, the following school certificate:

1821. April 12, Class No. (None)

MOORSBURG (Notice spelling) SCHOOL

This is presented to Francis Sholes as the reward of diligence and virtue, and in confirmation of his meritorious deportment in school.

HIGHLY RESPECTED PUPIL

May Science fair, inspire your mind,
With wisdom, and with thoughts sublime;
May Piety your ways control

And God, in mercy, save your Soul

From your affectionate Preceptor

JOHN LAIRD

The girl he was to marry, Mary Jane McKinney, a boyhood sweetheart, went to the same rural school. She was a little younger, being born August 11, 1821. They took turns playing on each other's farms and promising that when they grew up they would marry each other.

While still young his parents moved to Danville where his mother died in 1826, when the boy was seven, being buried in what is since Danville's Memorial Park; and where he attended Henderson's school until fourteen. In town it is believed the family lived in the first block on Water street where Christopher's father also had his cabinet shop.

"Then Christopher was apprenticed to the printing trade as a shop 'devil' on the Democratic Danville *Intelligencer*," founded in 1828 by Valentine Best, later a Senator from the Danville end of Columbia (now Montour) county.

Here while monotonously having to sort type he would occasionally amuse himself by printing his lengthy name, placing the individual letters one after the other. Said to have become a master printer at eighteen, and indeed editor of the *Wisconsin State Journal* at nineteen, later he was to recall that this earlier "recreation" in all probability "had implanted in my mind the embryo of the mechanical typewriter."

So in Danville it must have been that he first put his inventive mind — the mind that was destined to blossom into mechanical genius — to work. But it was in a little Milwaukee machine shop, quite a while later, the theoretical

conception of the modern typewriter with its principle of movable types was to take place.

When he had completed four years' apprenticeship, his parents moved to Wisconsin, settling in Green Bay. This was 1837. There and throughout the state his brother, Charles C., a printer like himself, was already well known in politics. Besides, he owned and edited the *Green Bay Democrat*.

Land offices had been established at Green Bay as well as Mineral Point in 1834. On top of this came President Andrew Jackson's proclamation of public land sales. This gave settlers their golden opportunity of owning portions of the great new empire, and so in 1835 the vanguard of early settlers built homes on the sites of the present cities of Kenosha, Milwaukee, Sheboygan, and Racine which, like other eastern Wisconsin villages, were easily reached via Lake Michigan.

Since regional railroads at this time were still in swaddling clothes (Wisconsin's first materialized in 1850), and the Milwaukee and Rock River Canal never did become a reality, chances are the Sholeses entered the state in 1837 by stagecoach, overland wagon, and/or lake boat. How they traveled from Pennsylvania to Wisconsin has not been ascertained but they may have employed rail, canal, horse-drawn vehicles, and lake boats.

Charles Sholes' middle initial "C" presumably stood for Clark who, Historian Frederic Godcharles said, was an adopted resident of Montour county, a journalist, became one of the early promoters of the Harrisburg, Pa. *Telegraph* and conducted a paper in Wisconsin.

He also said he was the father of Christopher Latham, but history doesn't seem to corroborate this paternity, or this Danville affiliation. It's been pretty well established that

the "Charlie" Sholes, whom a few old Danvillians remember, was Charles Lyman Sholes.

The name of "Charles L", presumably Charles Lyman, appears on four deeds in the Danville court house from 1854 through 1885 and he is listed as a Pennsylvania volunteer, H, Ninety-third, Danville "north" ward, in the Civil War, but at this writing his relationship to Charles Clark or Christopher Latham has not positively been ascertained. "C. W." Sholes and "C" Sholes are listed as students in the old Danville, Pa. Institute. Their relationship to these others, if any, is also unknown.

Although in rather delicate health, Christopher went right to work at his trade upon reaching Wisconsin. Wasn't this wild region at the edge of the great pine forest certain to restore it, repair his weak lungs? He had accepted an offer on his brother's *Democrat* — and gone west. "For good and all," it is said, but there is evidence he came back home at least once.

Within a year, at the age of nineteen, he became state printer and had taken charge of the House Journal of the Wisconsin territorial legislature, carrying it to Philadelphia, a long and difficult journey to be sure, to be printed in book form. He was displaying ability and trustworthiness.

At twenty, in the year 1839, he left home to follow his brother Charles to Madison where the latter had acquired a substantial interest (or owner) in the *Wisconsin Enquirer* (*Inquirer*). He was so punctual in returning the journal volumes, they were styled so well and correctly, that he was given charge of the paper, still continuing, however, to supervise public printing.

After service for a year as its editor and as journal clerk of the legislature, he moved to Southport (later Kenosha), Wisconsin to establish, with friend Michael Frank

and become editor, of the *Southport Telegraph*, afterwards the *Kenosha Telegraph*, whose name was inspired by Charles Wheatstone and Samuel F. B. Morse's invention.

Morse had successfully demonstrated his magnetic telegraph and Sholes already visualized its importance in the rapid transmission of news. He was twenty-one and it was 1840. Public spirited and honest, he soon became a trusted leader in Kenosha. He resigned when he was appointed Southport's postmaster in 1843 by President Polk, after three or four years' service. He later became postmaster of Milwaukee also.

A man of clear convictions, Sholes saw an exclusiveness in the churches, a gradual divorce of the educated few from the unlettered, numerous plain people, and he deplored the fact. By way of remedy he took a hand in founding the Excelsior Church with pure Democracy as its cornerstone. Men and women of all shades of belief and disbelief were invited to participate in its free discussions of life here and hereafter. For two years the group held together, making a deep mark on the community. Then it fell apart, never to reunite.

Chapter IV

TYPEWRITER NO LONGER A CURIOSITY

While the typewriter in its own undramatic way is an indispensable universal institution in war or peace and now admittedly one of the most important inventions of the 19th century, people living today can remember it as a curiosity. While today it is vital to the Army, Navy, Air, Marine Corps, and Coast Guard (the U.S. government operates over 800,000 Standard machines) as well as in the conduct of world business and all newspaper offices, some people still remember when there was no such thing.

Even Sholes believed it would prove only a passing novelty, later viewed the big market as being among pastors — in the writing of their sermons! The inventors as a group listed court reporting as the principal field for use of the machine. The order after that was lawyers, editors, authors, and lastly clergymen.

The first typewriter catalog listed reporters as first among prospective users. At any rate, these were, apparently, the only classes of users considered worthy of a special appeal. No special mention is made of its business use in the first typewritten catalog.

Only indirectly is the business man included, in a single, “ketch-all” sentence: “The merchant, the banker, ALL men of business can perform the labor of letter-writing with much saving of valuable time.” Sholes himself knew most men of the time said such devices would only be toys.

“. . . You know that my apprehension is that the thing (typewriter) may take for awhile,” Sholes typed on June

9, 1872 in one of his not infrequent fits of deep despondency, "and for awhile there may be an active demand for them, but that, like any other novelty, it will have its brief day and be thrown aside. Of course I earnestly hope that such will not prove to be the case, and Densmore laughs at the idea when I suggest it, but I should like to be sure that it would be otherwise."

But fortunately before this he resolved to make one — a good one — and today we know that the introduction of the typewriter permitted women to enter business and developed a new system of practical education: the business or commercial course in high schools, and the business college.

Most appropriately, the world's first girl manipulator of the typewriter keys was Sholes' own enthusiastic daughter Lillian who, as Mrs. Charles L. Fortier, died September 30, 1941 in her Milwaukee home at the age of eighty-five. (Her husband died in 1933.) She was an extremely shy person, who never wanted her photograph taken.

Tribute was paid to her memory by Peirce Business School of Philadelphia the week of February 9, 1942. It consisted of a recital of the main facts of her life and the publication of those facts in *The Peirceanian*, official school paper, issue of February, 1942.

She and her husband were prominent figures at the 50th birthday celebration of the first marketable typewriter held in Ilion, New York, under the auspices of the Herkimer County Historical Society September 12, 1923.

On that occasion Elizabeth Latham Sholes and Christopher Latham Sholes IV, grandchildren of the famous inventor, unveiled a commemorating monument in Sholes Park, a plot near the Remington factory dedicated to the little known inventor, "in ceremonies that paid fitting tribute to the man whose patient genius gave us mechanical writing."

Affixed to it is a bronze tablet inscribed with words from the news section of Geyer's semicentennial *Topics* issue. The tableted stone was erected by the historical society.

(Sholes Park, now Jacobus Park, in suburban Milwaukee likewise perpetuates his memory. Conspicuous in a new Milwaukee park is to be a bust of Mr. Sholes, accompanied by the bronze figure of a woman stepping forward confidently, a symbol of the typewriter's part in the progress of the business woman.)

Charles E. Weller, the first typewriter operator or typist, once secretary of the National Shorthand Reporters' Association, was also a conspicuous figure present. He is to be remembered as the "friend Charlie" to whom Christopher shipped his first workable typewriter for practical testing during the first two weeks of January, 1868.

According to the Herkimer county history Weller identified the July 14, 1868 model as being the first one Sholes sent him to test. It was said to be capable of fifty words a minute, all in capital letters.

Weller tested not only this but subsequent Sholes models in connection with his regular job in St. Louis as "Official Shorthand Reporter." He had seen the first "w" model in July, 1867. Both the first and second patented models have the up-strike pivoted typebar, later a standard feature for many years.

The girl Lillian had watched her father at his early experiments and at sixteen, in the year 1872, learned the keyboard, put the machine to practical use.

On a certain day (Howard Blackman says at twenty) Miss Sholes was asked by her father to show Densmore and the inventors that she could run the machine. He was a proud father, as what father isn't? And so she wrote:

"Dear Friend: This is a writing machine by which words can be written easily and read by all."

(Later Philo Remington wrote on it too—in front of one Prof. Benedict, head of Remington's sewing machine department. This is the man who is quoted as saying, "We must on no account let it get away!" — from Remington. "It isn't necessary," he went on, "to tell these people — Densmore, Yost, and others at the Remington interview — that we are crazy over the invention, but I'm afraid I am pretty nearly so . . . It is a wonderful invention if it's anything, and we should not neglect the opportunity offered us to examine it . . ." This would seem to confirm that he was quick to grasp practical things. He was also a man of great poise, spoke quickly but clearly.)

Lillian thus became the spiritual mother of the thousands of young women who have, are now, and will ever pursue the profession of typist. Seated at one of her father's early models, she was prophetic of the millions of women who have since earned their livelihood in this way.

The first typist, she is the symbol of the emancipation of women to the business world. And do you have any idea what figure this represents? Why, the number of typists and stenographers increased from 112,364 in 1910 to 811,190 in 1930. In 1956 there were 1,650,000 people in the United States who earned their living by typing.

One theory has it that women are supposed to have a surer and more deft touch than men. Which would seem to be borne out by the fact that Mrs. Margaret Hamma Dilmore, thirty, Brooklyn, New York, holds the all-time world's typing record on the Standard keyboard of 149 net five-stroke words a minute for sixty minutes, according to the last official record of *Philadelphia Record* as reported by Charles Martyn, that newspaper's librarian. This was

confirmed by Vivian Wallis of the IBM Corporation January 29, 1947.

Incidentally, it was at Chicago, in June 1941, that Margaret bettered Albert Tangora's record, set in 1937, by eight full words, doing so on an IBM electromatic typewriter in the International Commercial Schools Contest. She was the first woman in twenty-five years to win the world's championship, and actually set three new records: one hour professional world's championship; thirty-minute amateur world's championship; one hour women's professional world's championship.

Tangora, also competing in this contest, wrote 142. However, he has written as high as 220 words per minute for periods shorter than one hour. In 1906 the world's record was eighty-two words. Effort made to contact Miss Hamma by mail for confirmation and additional or more recent data failed because of insufficient address. Then, having secured the correct street and number through the courtesy of *Brooklyn Eagle*, she failed to reply.

Present world's champion typist is Miss Stella Pajunas, of Cleveland, Ohio — see cut — who, in the Tenth Annual International Commercial Schools Contest in Chicago, June 19, 1946, typed 140 net five-stroke words per minute for one hour, using an IBM electric typewriter. In the 1946 contest Mrs. Dilmore typed 138.

Miss Pajunas really won four separate typing titles: 140 net five-stroke words per minute — world's professional, women's professional, and amateur championships; 137 net five-stroke words per minute — new world's record for novice typing.

Typing 131 net words per minute for one hour Mrs. Lenore Fenton MacClain of Arlington, Virginia, became the world's champion on the simplified or Dvorak keyboard

— in the same international contest that saw Miss Pajunas win the world's championship on the Standard.

Almost from the start women were sought as operators. Tintypes and other photographs belonging to early typewriter companies show women in leg-o'-mutton costumes seated before what today looks like an unwieldy machine. The crude, cumbersome machine Lillian used is indeed in marked contrast to the sleek, streamlined typewriters prevalent nowadays.

And the attitude of businessmen has changed too. Many of the long ago were unwilling to relinquish the old method of writing letters by hand. Such a letter they considered too impersonal. Mrs. Fortier herself said that businessmen objected to the sound of the typewriter, while others were actually annoyed at receiving typewritten letters. Frequently they would dictate testy replies to the effect that they were perfectly able to read handwriting, and besides — they didn't like correspondence all in capital letters!

Classic and typical of many cases is the story of the Kentucky mountaineer who promptly returned the first typewritten letter he ever received after having first indignantly scribbled on the margin, "You don't need to print no letters for me. I can read writin'." The curious and skeptical folk, furthermore, couldn't see paying \$125 for a writing machine when pens could be bought for only a penny! But first speed, and secondly legibility, would finally be the two considerations to tip the balance in favor of the writing machine.

And it took years for most of the bias against women working to be dispelled. Actually it still exists in some places, although widespread use of women in World War II and since has just about squelched it. The typewriter provided the opening wedge.

The law of necessity and fitness in the business offices back in the late 1870's broke the barrier, dictated this really radical innovation, and neither the gravest masculine doubts nor the general lifting of eyebrows could stop its development.

"The typewriter was the tool with which women first pried open the doors of business," someone has written. "They used it well: it helped them grow indispensable in offices." Sholes put the feminine touch into business.

General Francis Elias Spinner, U.S. Treasurer in 1861 in Lincoln's cabinet, to whose memory the "women of the departments of the government" erected a statue at Herkimer, New York, was instrumental in introducing women to employment in the offices of the federal government because they were so needed in Civil War time.

As in our day, they did a good job. The prejudice against women in clerical capacity was as typically blind and unreasoning as it was universal. As one woman office worker wrote, "I worked for nothing, boarded myself, and was lied about!"

Now no longer is the pen in competition with the typewriter. Today the latter monopolizes commercial correspondence, and it should. Without it, office work could not be carried on to the degree of present-day efficiency. Nor could commerce continue in any volume. Today the typewriter is so essential in business correspondence, "and out of the idea of writing readable characters with perfect registration and clearness has expanded the application of machine writing to the art of bookkeeping."

Among the obstacles which made the early progress of the typewriter so slow and difficult was the task of furnishing an operator, or typist (the word "typewriter" can also be used in referring to a male or female typist). In the early

days none was to be found. The typewriter salesman also had to "sell" or persuade people to become operators, and succeeding, in most cases train them. Shorthand reporters of the day were especially helpful to typewriter agents, for it was mainly through their influence and recommendation that sales of their machines were made.

The universal "touch" system itself, by which the typist can position-feel the desired keys and save looking, "was originally devised for the blind" to communicate thoughts to others, states Compton's *Pictured Encyclopedia*. And by none other than Christopher Sholes himself, who was inspired to do so at seeing blinded, Civil War veteran Grant Herrick poking his way as he peddled his wares along a Milwaukee street.

"How wonderful it would be," said Sholes, pausing with his co-workers Glidden and Soulé, to gaze out of the window at the tragic sight, "if we could help the blind in some way! . . ."

This fact seems reasonable and the motive very fine when one considers the compensatingly keen sense of touch all blind possess, and Herrick's obvious need of help. Remember, Sholes was kind and generous. This expressed hope reveals his sympathetic spirit. Compton further points out that special touch devices are employed in teaching the blind geography, arithmetic, and natural history.

In the very beginning the touch system and the mechanical writing machine were thought of as one idea; a blind man couldn't write without a machine, nor could he write unless that machine possessed keys systematically arranged so that he could memorize the keyboard.

The rapid progress of the operator in contrast to the slow, successive development of his machine was due to, and dates from, the introduction of this scientific method of key fingering known as touch or all-finger typewriting.

In the touch system, of course, the typist does not look at the keys, concentrates on shorthand notes or copy, just as a trained pianist does not regard the keys of the piano-forte. In the older method the operator types at a time only so much as the eye in one look can retain.

Whoever the person was, the first touch typist was the first blind typist. An accomplishment first of the blind, the touch method they transmitted to all the willing, seeing typists of the world. It was the advent of this which really hastened and assured the success of the shift-key over the larger, double keyboard machine. Paradoxical indeed was the fact that blind operators could "see", or feel, what sighted typists could not, and do a more accurate job faster.

In a few years, however, a few sighted typists acquired the art of touch. The first on record was Frank E. McGurrin, a Grand Rapids law clerk. Self-taught, he became the speed operator of his time, gave exhibitions during the eighties. Most notable contest was the one between him and Louis Traub, decided at Cincinnati, July 25, 1888. Traub, in a "hunt-and-peck" performance, was so convinced by McGurrin's superior show that he subsequently became an expert touch typist.

The first business school to teach touch typing was Longley's Shorthand and Typewriter Institute of Cincinnati. Mr. M. V. Longley introduced the system. Bates Torrey was the first to use the word "touch" in a printed manual.

Chapter V

THE TYPEWRITER TO SHOLES' DAY

From the archives of the British Patent Office we learn that as long ago as January 7, 1714, the same year she died, Queen Anne of England granted a patent to Engineer Henry Mill for . . . "An Artificial machine or Method for the Impressing or Transcribing Letters, Singly or Progressively one after another as in Writing, Whereby all Writing whatever may be Engrossed in Paper or Parchment so Neat and Exact as not to be distinguished from Print; that the said machine or method may be of greate vse in settlements and publick recors, the impression being deeper and more lasting than any other writing, and not to be erased or counterfeited without manifest discovery; and having, therefore, humbly prayed vs to grant him our Royall Letters Patents for the sole vse of his said Invention for the term of fourteen yeares, etc. . . ."

In a single sentence he thus wrote himself down in history as the first man who is known to have conceived the great idea. This earliest English patent was number 395, dated by *Encyclopediæ Britannica*, 1714.

Mill, stated to have been "engineer to the New River Water Company," claimed he had brought his invention to perfection "at great pains and expense." But beyond the title his patent gives no indication of the nature or construction of the machine.

Only a few other attempts are recorded throughout the remainder of the 18th century. One was a machine for embossing printed characters (a writing frame; inventor,

L'Hermina, French) for use by the blind, said to have been invented in 1784. Like Van Knaus' of Stuttgart, between 1753 and 1760, the Graf von Neipperg (1762), Pingeron's in 1780, and Louis Jacquet's about 1780, it should hardly be dignified by the term "machine" for it was simply a primitive variation of the pantograph or mechanical hand-writing appliance.

Whether or not Mill tried to build a model after he sold the idea to his queen is not known. Evidently he was a better salesman than a creator. Anyway, between that date and 1868 numerous (Remington claims more than fifty) attempts, both here and abroad, were made to perfect a "letter-writer". None was successful.

Andrew Geyer, Inc., New York, in his reprinted typewriter encyclopedia of 1924 (and it was his "earnest purpose to include every typewriter ever known, regardless of the degree of success which attended its introduction into the field") lists no fewer than 315 weird and wonderful writing machines since the beginning and as of August 1, 1924.

These machines, Remington adds, employed various principles, and ranged in size from a grand piano to those small enough to slip into a coat pocket. Eugene M. Long invented one of the latter at Charlottesville, Virginia, in 1906.

The first recorded effort to build a writing machine in America is that of William Austin Burt of Detroit, Michigan, to whom, on July 23, 1829, the U.S. Patents Office granted letters of patent "for a machine for printing" which he self-styled the "typographer", a crude device developed in 1828 whose patent is signed by President Andrew Jackson.

Unfortunately all records and the only model of it were destroyed in the great Washington patent office fire of 1836

but a picture of its replica, which came many years later, looks much like a pinball machine.

Working from a parchment copy of the original patent and other papers held by Burt's family, the patents office was able to reproduce William's typewriter which was exhibited at the Columbian Exposition of 1893. It is the ancestor of modern typewheel machines by virtue of the fact that it carried the type not on individual bars, but on the segment of a circle. Burt became better known later on as the inventor of the solar compass.

"Burt's Family Letter Press" was never manufactured but it was talked about. In May, 1829 a correspondent for the *New York Commercial Advertiser* described it as "a simple, cheap, and pretty machine for printing letters." And the editor commented highly on its possibilities: "It should be found to fully answer the description of it." Both editor and correspondent, though, were "stumped" in trying to suggest a suitable name for it, a point on which Burt had solicited advice.

Charles Thurber's (Worcester, Mass.) machine (patents 1843, 1845), intended for the use of the blind, possessed one notable advance; the letter spacing was effected by the longitudinal motion of the platen, a principle which features all modern machines.

R. J. Scott's *Scrap Book* (King Features Syndicate, Inc., February 15, 1944) asserted "The first typewritten letter on record is one written in 1843 twenty-five years before typewriters were patented by Sholes and Glidden," and showed a cut of the Thurber machine without giving its inventor's name. While *The Story of the Typewriter* said this machine "did excellent work . . . none were manufactured."! It did not possess enough merits to recommend it and was soon put aside.

One of the earliest patents for printing instruments granted was that of Alfred Ely Beach—June 24, 1856, U.S. patent number 15,164. Like many others of this early period it was designed to benefit the blind. Among earliest forms also was the invention of Dr. Samuel William Francis ("The Francis") who received letters of patent October 27, 1857 (U. S. A. No. 18,504) for a writing machine which contained nearly all the features of subsequent devices. Complicated, it was much simplified by later inventions.

James B. Hammond, inventor of the typewheel machine which bears his name, felt in 1880 that the arrangement of keys on the early Remington could be improved upon. Accordingly, he devised the "Ideal" keyboard. It was supposed to give the operator much greater speed than could be obtained from the "American Standard" because the characters most frequently used were put in such positions that the fingers of the operators could manipulate the keys faster.

Another incentive was the demand by some countries for keyboards with different arrangements—which resulted in the variations in the French keyboard, for instance, in contrast to the American (Standard) grouping. But the public had already been educated to what had now become known as the Standard—the "universal" arrangement. Later Hammonds have conformed to the universal keyboard arrangement.

This Standard keyboard according to Andrew Geyer was adopted by Christopher Latham Sholes at the suggestion of his son Louis who is known to have given much thought to rearrangement of the printer's case to something more convenient to both hands. The Herkimer history states it is positively known Densmore and Sholes, laboring together, worked out the universal, four-row arrangement.

G. Tilghman Richards (see bibliography), however, states the basis upon which the universal was finally arranged was a list "of the frequency of juxtaposition with which the letters in written English occurred" as prepared by Amos Densmore's son-in-law who at the time was a superintendent of schools in western Pennsylvania.

But Frederick Heath, a lad who was employed as a messenger by Sholes as the latter began to devise his typewriter, said years later the inventor's original idea was to fashion his keyboard after that of a piano: first row of ivory, duly lettered; second, of ebony; and a third made up of letters and characters in the form of pegs but little used.

The keyboard of the first model resembled a piano's with two rows of keys, in strictly alphabetical and numerical order:

3 5 7 9 N O P Q R S T U V W X Y Z
2 4 6 8 A B C D E F G H I J K L M

Charles Weller wrote that the keys were of black walnut, three inches long by a quarter of an inch wide, with the letter of the alphabet to whose corresponding typebar it was attached painted in white. Between each was space sufficient to insert shorter keys, resembling black piano keys, for figures and punctuation marks.

Figures ran from 2 to 9, letter "I" was first and "O" was used for the cipher. There were a semi-colon, dollar mark, hyphen, period, comma, question mark, and a diagonal stroke for the parenthesis. The keys and typebars being connected and in turn working in conjunction with the carriage made possible for the first time the printing of words and then sentences, Mr. Weller goes on. James H. Collins' (see bibliography) description was essentially the same.

Sholes did not know that Dr. Francis in his remarkable machine of 1857 introduced keys in peg form and arranged in four rows to greatly shorten the journeys of typists' fingers. At length, at the instance of his model-maker, Matthias Schwalbach, Sholes abandoned the piano keyboard for something approaching the present order which, like the compartments of a printer's case (Sholes and Glidden were both compositors), places characters oftenest used nearest to the working center.

However, since the arrangement of the letters on the universal keyboard is nothing like the arrangement of the type in the printer's case, it is likely the universal was mainly influenced by Sholes' mechanical difficulties.

On all Sholes models the typebars had a tendency to collide and stick fast to one another at the printing point because of arrangement induced by his printing background, and it would have been only natural for the inventor to resort to any arrangement that would mitigate this trouble.

So he and Glidden conceived the idea of arranging the keyboard in such a way that the letters which occurred most frequently together were placed as far as possible apart in the typebasket. What resulted through demand and usage became "Standard" and sometimes was advertised that way.

Typewriter manufacturers maintain, according to *Business Week* magazine, that the reason the Standard keyboard is as it is stems from the fact its three inventors — Sholes, Glidden, Soulé — had their inventive limits, never got over their surprise that anyone would want to use more than two fingers. The three, they add, simply patterned it roughly after the distribution of letters in a printer's case for hand-set type, and the pattern stuck. After the best key-

board was worked out, the three changed the wooden keys to metal rods and set their typebars in steel bearings.

Some believe the universal arrangement was devised by Alexander Davidson, a West Virginia mechanic and surveyor, and a pioneer in the field of commercial education. While Davidson did make a study of scientific keyboard arrangement in the latter seventies, there is no evidence to show he ever saw a typewriter before 1875, at which time of course the keyboard had already assumed the "universal" form.

"Differential" spacing of characters remains a debatable question. Some English inventors favor it but the Americans abandoned same "as an unnecessary and difficult adjunct." Whereas the ordinary typewriter allots the same spacing to a narrow "i" as to a wide "w" or "m", differential "justifies" the space as in printing.

A disadvantage of differential spacing is that if a mistake consisting of narrow letters which must be replaced with wide ones is made, erasure leaves insufficient space to do so.

Still unsettled, too, are the arguments for and against shifting the platen versus the typebasket; and the use of the convenient Standard four-bank keyboard with single shift as against the compact, cheaper, three-bank with double shift.

Chapter VI

WILL SHOLES SUCCEED?

It remained for the mechanical genius of Sholes to succeed when all before him had failed. The art of Johann Gutenberg was about to furnish (Wasn't it appropriate?) in one of its disciples the inventor of the typewriter. Following his printing apprenticeship he struck out. "In turn he became editor of several newspapers and finally an owner," to quote *The Potter County (Pa.) Enterprise*.

To follow the craft of printing was to wander considerably, which Sholes did. Milwaukee, Gateway to the West, attracted him; on his business trips he observed it was outstripping other Wisconsin cities. "Now he was settled in Milwaukee . . . where he had been appointed Collector of Customs at the Port" by President Abraham Lincoln. He gave up editorship of the *Milwaukee Daily Sentinel* to become collector. Previously he had been editor of the *Milwaukee News*, moving his family to that city in 1860 for the job. In both jobs he served a long time.

Through his activities as a journalist and postmaster he was eventually drawn into politics in spite of the fact he was very poorly fitted for it by character and temperament. Always prominent in Wisconsin public life, nevertheless, he served with credit to his constituents two terms as state senator, one in the state assembly, was commissioner of the public works, comptroller.

He was state senator from Racine county in 1848 (the year Wisconsin was admitted to the Union) and 1849, and

from Kenosha county in 1856 and 1857, while in 1852 and 1853 he represented Kenosha in the assembly.

While the Honorable C. L. Sholes was comptroller of Milwaukee he had occasion to enter into a contract, on behalf of the city, for paving certain streets. It was after he had gotten his early models to work, for he had the contract typed on one of his machines and this is claimed to be the first official document ever produced on a typewriter.

The well known practice sentences "Now is the time for all good men, etc." and "When in the course of human events, etc." date from Sholes' day, inspired by an exciting political campaign. They were used to test speed of the first machine, according to Charles Weller.

In Milwaukee with its comparatively large population, his ability and straightforwardness gave him an even wider group of friends than in Madison and Kenosha, won for him elections. This was one means of expressing regard for him on the part of the people.

In politics as in his religious convictions Christopher was equally a servant of ideas. He joined the Barnburners' wing of the Democratic party, fought hard against slave-holding influences in national lawmaking.

As a senator in 1853, according to George Iles (note above that one informant had him as an assemblyman this year), he introduced a bill to allow Negroes claimed to be fugitive slaves the right of habeas corpus and trial by jury, but his measure was defeated.

A mob in Milwaukee rescued from jail the following year Joseph Glover, a runaway slave, enabling him to escape to Canada. Then the state and federal courts clashed on the question, "How far could a state protect its citizens from arrest and imprisonment at the hands of national authority?"

Meanwhile the chief justice of the Wisconsin Supreme Court declared the Fugitive Slave Law unconstitutional and void. On the strength of this the state openly nullified pro-slavery laws of federal enactment, with the outspoken approval of its people.

When the inevitable conflict between slavery and freedom burst into flame, no state of the Union sent braver troops to the fronts year after year than Wisconsin. Every fifth male in her population became a soldier and her death list reached 10,752.

Sholes, now forty-two, took an unwavering part in all that preceded an appeal to arms and that went to bestow victory upon the northern soldiers. The influence he exerted was as wide as the state.

An incident occurring in Sholes' life during the Civil War demonstrates that while he was of a gentle and modest demeanor he was not lacking in moral courage when occasion demanded. His heart was always stout as well as great.

One day he and Charlie Weller were at lunch in a Milwaukee restaurant when two Union army officers entered and took a table in a nearby booth. One of them, having noticed Sholes as he passed, said to the other:

"That's the fellow who wrote us up in his paper and said we ran like white cats at Wilson's Creek."

One less sensitive of personal criticism — or less courageous—might have let it pass. But Sholes' keen ear caught it and never hesitating, he went to their table.

"Are you alluding to me, sir?" asked the commanding figure, in a very quiet, even tone.

"Well, you are the editor of that paper, and I suppose you are responsible for its statements!" The officer, taken aback, was nevertheless almost defiant.

"You are very much mistaken, sir," replied Sholes. "I had nothing to do with the publication of that statement and if I had seen it in time, it would never have appeared. I have too much regard for the boys who are fighting our battles while we are enjoying the comforts of our homes to allow them to be slandered in the public press. I only regret that my age prevents me from serving in the field in defense of my country!"

Such evident sincerity and manliness could not go unrewarded: the officer apologized at length; the two separated, friends.

While a member of the Wisconsin assembly from Kenosha county he was profoundly moved at seeing the murder by shooting of Charles C. P. Arndt, the representative from Brown county, by James R. Vineyard, councilor of Grant county, over the naming by Governor Doty of Enos Baker for the office of sheriff, Vineyard having advocated his brother.

The case was moved from Dane county to Green county and Vineyard was acquitted of the manslaughter charge, but he became a shunned man and afterward sought a new life in California.

Sholes recounted this and other acts of violence in the *Southport Telegraph*, all of which he attributed to the "brutalizing influences of slavery." The Arndt murder story caught the eye of Charles Dickens who, shocked by it all, retold it in his *American Notes*.

And while a member of the Wisconsin state legislature in the early 50's Sholes was the sole dissenter in a railroad land "steal." Indignantly he spurned a bribe which no one else, not even the governor, refused. It would have been the foundation of a fortune he never did acquire, but he was incorruptible.

It is not, however, as a legislator, a public official, or an editor that Sholes shall be remembered or by which he has gained fame, but through the art and craft of printing he learned as a youth. He frequently said most of his education was gained from his newspaper work.

Chapter VII

CHARACTER OF SHOLES

Sholes was a common man, a thinker, an idealist, but also a doer! His deep-set, remarkably clear eyes were sad, his mouth determined. Of his mouth an artist has said: "It was well formed." His eyes had that far away look attributable to genius.

Deliberate in his talk, yet there was a persuasive quality in his voice that compelled listening. This was while engaged in private conversations with his friends, however, for we shall see later, manifestation of his shy, quiet, sensitive, retiring nature.

A man of vision, Sholes was a typical example of American inventive genius, energy, pioneering spirit, and individual enterprise. He typified that nameless quality — a force of fine character inherited from his Old World ancestors — of daring, energy, enterprise, and aspiration that has been, and indeed always will be, such a power in the course of American history.

He was growing old — but only in years; his voice was young, his spirit gay. He was slender frail and tall, his hair was long and flowing and white and his beard and mustache matched, but he was still dreaming and that was a sign of youth. He had not grown too old to dream. After all, as the late John Barrymore truly said, a man is not old until regrets take the place of dreams.

There are only two occasions on record that this kindly, modest, benign, lovable man is said to have digressed from

his even, mild-tempered disposition and one of them was like this:

In those days even in cities, as it is today in towns, it was usual for newspapers to conduct on the side a job printing department, as a rule at considerable profit. One day the compositors on Sholes' newspaper went on a strike and this so angered Editor Sholes that he gave the first serious thought to typesetting by machinery. He built models in which types impressed themselves on wax, but the wax bulged in provoking ridges that spelled utter failure. So he cast his models aside, made peace with the staff.

Generally we can picture him as a pleasant, genial, friendly, gentleman given to smiling, though not to boisterous laughter. He dressed plainly and was inclined to be a little careless about his person, as some older people grow to be. He liked chess, was an inveterate punster, and could capably — sometimes grotesquely — paraphrase the poets.

If he was eccentric, his eccentricities were endearing. If he was more than just to others, he was less than just to himself. As editor he always copied into his own paper all adverse criticisms, some very bitter and unjust, leveled against him by his political adversaries, while at the same time omitting all complimentary mentions of his work or himself.

In his whole lifetime he never sought or obtained rewards or honors. Most unselfish, kindhearted, companionable, simple, modest in manner, tender of conscience, honest, intergritus, gentle, lovable, cultured, brilliant — these are the adjectives that describe the character and personality of Christopher Latham Sholes.

Hilda Clark Fairchild, also a native of Mooresburg, explains and correlates the various manifestations of Sholes' magnetic personality through astrology. She said his as-

trological chart proves what was said of him is true; that among other virtues, he possessed modesty, generosity, and kindness; he loved liberty of speech and action. His chart shows him to be an advanced uranian or humanitarian and as such, indifferent to worldly fortune.

As an aquarian inventor he was an improver and a re-organizer. ". . . With three of his planets, or urges, in addition to his Sun, the power urge, posited in the home of Uranus and harmonious to Uranus itself," Mrs. Fairchild continues, "Mr. Sholes was bound to be more than just 'An Improver.' He was a Creator! . . . We Montour County natives feel proud to claim Christopher Sholes as 'one of us.' But we do not forget his genius belongs to the universe."

He was destined not to leave, only to accumulate, money. In this he was accomplishing what he wanted. For in his later years he remarked facetiously to a friend that he had sought all his life to escape becoming a millionaire, . . . "and I think I have succeeded admirably."

Even before the typewriter entered his life he had, by a stroke of luck, acquired wealth, according to the Herkimer county account. How, we aren't told. But he didn't keep it. In the typewriter he had another opportunity. However, the circumstances and the terms of transfer in this case are outlined in this story. From first to last Sholes seemed singularly indifferent to worldly riches.

". . . He was always a visionary," states the Herkimer story, "and one of his visions was of a human Utopia which should witness the abolition of greed and poverty and the dawn of universal love." A dreamer to be sure, but one dream he dreamed he translated into a wonderful reality which has placed the whole world — a world so far slow to acknowledge it — in his everlasting debt.

Sholes, a man of brains, character, and courage, was also a man of changing moods. He reveals it in his own letters, everyone typed by himself on his own machines, written to Weller from 1868 to 1873 concurrent with the latter's work of testing models.

In one: ". . . The machine is done, and I want some more worlds to conquer. Life would be most flat, stale, and unprofitable without something to invent. . ." Two months later, ". . . I have now a machine which is an entirely new thing. I have been running this about two months, and in all that time it has not developed a single difficulty. In fact any such thing as trouble or bother has ceased to enter into the calculation. . ."

Though this sounds good and final, listen to an excerpt from the last letter in this series, dated April 30, 1873, two years after that "good and final" note: ". . . The machine is no such thing as it was when you last saw it. In fact you would not recognize it. . ." Like other artists, Sholes is through and yet never through. But this time indeed he was through. For at this writing the contract with Remington had been placed.

Chapter VIII

DOWN TO CASES

Early in his newspaper work Sholes had been the first to devise a method of addressing newspapers by printing names of subscribers on the margin but because at this time he was too busy, he couldn't follow closely his inventive bent. Now presumably as collector he had less arduous duties and could exercise these talents again for "all during January 1866 in his spare time, with another ingenious printer and practical machinist named Samuel W. Soulé, the elderly printer was working on a machine for the serial numbering of blank pages." (The year 1866 also saw Cyrus West Field complete the laying of the Atlantic Cable.)

Often it had been his job to number by hand the pages of account books — by means of a metal stamp like those of Italian copyists of centuries ago. It occurred to him that to use a metal "finger" for this purpose was a much better idea. It occurred to him that he could devise a machine to perform this work much more neatly and quickly.

He discussed this project with his friend Soulé. At once they began work in a small, grimy and dingy room on the upper floor of a two-and-a-half story simple, old Ashler mill in the northern outskirts of Milwaukee owned by Henry Smith, an old friend. It stood on a narrow strip of land between the Milwaukee River and the Milwaukee and Rock River Canal. Presumably this is the building also described as "Kleinsteuber's small, two-story machine shop."

It faced a quiet, dusty street over which an occasional horse and buggy made its way to town, leaving a trail of

dust whose particles seemed to glisten, as they slowly settled, in the sun. On its roof it was identified as a "Brass Foundry" but over the sidewalk between floors there was a second, more pretentious sign: "Kleinsteuber — Machinist and Engraver — All Kinds of Small Machinery." (This site is in no way preserved or even marked, according to the best knowledge of M. C. Wittenberg, manager of publicity division of the Milwaukee Chamber of Commerce.)

Because the three were not mechanical engineers or even mechanics, only men amply endowed with inventive talent, they needed the help of Kleinsteuber's skilled mechanics to carry out their ideas. Outstanding mechanic was Matthias Schwalbach, a builder of tower clocks in Milwaukee, who now and also later in the typewriter venture, was about to offer enthusiastic help.

Here day by day Sholes drew his plans with Soulé's help. The inventors worked at benches amid the whir of machinery, the sound of hammers. Occasionally a friend or two would drop in and they would have a game of chess or discuss post-Civil War reconstruction and rehabilitation. Here their model gradually took form. (Sholes also had a small office in the Ludington Building in which, it was said, he was tinkering with a machine called a type-writer.)

On the same floor, but in another workshop, another tenant, Carlos Glidden, worked. A plodding, yet intelligent attorney and an inventor of farm implements, he became interested in the experiment, offered his engineering talents. He was the well-to-do son of a successful and retired Ohio ironmonger and at the time was developing a mechanical "Spader" that would take the place of the plow. In many conferences the three discussed their plans, debated the weak points revealed as their experiments followed one another.

Sholes and Soulé, on September 27, 1864, were granted a patent for a paging machine and on November 13, 1866 one for numbering serially the pages of blank books, tickets, coupons, checks, etc. Soulé, then, was the "friend" referred to in one account as the co-inventor of the numbering machine. Sholes may have failed to build a typesetting machine but now he succeeded in this phase of printing.

On April 30, 1867 Christopher alone received patent number 64,375 for an improvement on the numbering machine. Later he was to substitute letters for numbers and develop his numbering machine into a writing machine. Fittingly, his son Louis, who had been closely connected with writing machine invention since youth, took the first paging machine of his father's to Chicago for demonstration.

One day shortly after Sholes and Soulé patented their numbering machine November 13, 1866, they showed it to Glidden. It turned out capital work at a pace far outstripping manual labor at its best and with infallible correctness. Glidden suggested to Sholes that as the latter had devised a numbering (paging) machine, he ought to be well fitted to build also a letter-printing machine — a writing machine — a typewriter!

"Why cannot such a machine be made that will write letters and words and not figures only?" said Glidden in a chance remark. "Sholes," he said, "why cannot you build a machine to print letters and words as perfectly as these figures are struck off here?"

That eventful summer of 1867 the trio (all three are referred to as "inventors", Glidden and Soulé, of course, having been invited to join the enterprise) obtained a description of a writing machine on the typewheel principle — from the *Scientific American* magazine, July 6, 1867 issue, which quoted an article from a London technical journal —

invented by the American John Pratt, of Centre, Alabama.

"A machine," prophesied Editor Alfred Ely Beach, a typewriter inventor himself, in the issue which ran the article, "by which it is assumed that a man may print his thoughts twice as fast as he can write them and with the advantage of the legibility, compactness, and neatness of print, has lately been exhibited before the London Society of Arts, by the inventor, Mr. Pratt, of Alabama. The subject of typewriting is one of the interesting aspects of the near future. Its manifest feasibility and advantage indicate that the laborious and unsatisfactory performance of the pen must, sooner or later, become obsolete for general purposes. 'Printed copy' will become the rule, not the exception, for compositors, even on original papers like the *Scientific American*. Legal copying, and the writing and delivering of sermons and lectures not to speak of letters and editorials, will undergo a revolution as remarkable as that effected in books by the invention of printing and the weary process of learning penmanship in schools will be reduced to the acquirement of the art of writing one's own signature (not yet—quite!), and playing on the literary piano above described, or, rather, on its improved successors."

Carlos Glidden, into whose hands it had fallen, had referred to this article in trying to persuade Sholes. Now as Sholes unfolded the new copy of this *Scientific American* and read the above prophecies for himself, he was very excited. Could the idea be as big as the editor suggested? Would people really use writing machines after they were made? Pratt's invention was designed to do exactly what Glidden had suggested. Called the "Pterotype" (winged type) and produced in England in 1866, it "was extremely crude and impracticable but it set the Milwaukee experimenters off on a new tack."

It had thirty-six types mounted in three rows on a type-wheel, the rotation of which brought the required character opposite the printing point, when the paper with a carbon sheet intervening was pressed against it by a hammer worked by the keys. Models were made for the inventor by E. B. Burge, of London. One of the earliest is in London's Victoria and Albert Museum. He developed several different models and it is not known whether that herein shown, patented in this country August 11, 1868, patent no. 81,000, is the first one he made.

Sholes' idea, however, was to simplify Pratt's invention. It struck him as complicated, likely to get out of order. He believed he could devise a mechanism more simple, and at least as efficient. In a week his first one-letter model was done.

Except for Pratt's "Pterotype", so far as is known, none of the three at the time had any knowledge of any previous attempts to invent a typewriter. At the outset they were wholly dependent on their own creative efforts and inventive talent. Yet rarely in the history of great invention had so much preliminary work already been done.

Some authorities don't think Sholes and his associates were unaware of past achievements such as the up-strike typebar system with circular typebasket of Ravizza, 1837; Beach, 1855; Francis, 1857; Mitterhofer, 1866; or House, 1865, or the similar but down-strike system by Progin, 1833, and Beach, 1855. They believe Densmore, for example, was too astute to sink capital into an experimental development without learning of Wheatstone's and Beach's (both 1856) arrangement in rows in bank of finger keys, and also House's in 1865; nor to have discovered House's work in 1865 with the cylindrical platen roller and various methods of line-and-letter spacing.

General William G. LeDue, the first man to introduce the typewriter into the government service at Washington, visited Milwaukee in 1867 and finding Sholes and Glidden busy on a bookpaging machine, suggested to them the idea of a typewriter. The Glidden and LeDue "suggestion" stories are not contradictory. The idea was "in the air." The typewriter's time had come. Hence it was only natural to find more than one influence at work. The time was propitious. The invention and the psychological moment coincided. LeDue's interest in the typewriter dated back to 1850.

Soulé had been a helpful partner in the numbering machine which was a success from the start. Would Soulé embark with him on his second project, Sholes pondered? Yes. Glidden, who had given the inventor his first push, was received as a third partner: he was to contribute the necessary funds.

Plans were sketched in a conference: First of all, a writing machine must write, but how was its paper to be imprinted? Soulé at length suggested the scheme, never excelled, of placing convergent typebars on the rim of a circle so that each might strike the center. It is not known now if this design was original with him or borrowed from Xavier Projean (Progin) on whose machine it first appeared in 1833. Again it appeared on the embossing machine of Alfred Ely Beach in 1856.

Other inventors like Charles Thurber in 1845 went astray in sliding their typebars through a horizontal circle, rotated on a vertical axis. When the operator wanted to print "A" he turned the ring until "A" stood over the printing point, then depressed the "A" typerod so as to leave that letter imprinted on the paper beneath. Too slow for practical use, this mechanism survived in toy machines.

Thurber's design, as has been said, displayed the cardinal feature of its paper being borne on a cylindrical carriage or platen, an indispensable part of all Standard machines.

The "new tack" initiated by the description of the Pratt machine reportedly didn't last long for Glidden, according to the Williamsport (Pa.) *Grit*, soon dropped out. Unimaginative and practical Soulé followed suit. For working capital, one by one his partners relinquished their rights in the patents. But Glidden and LeDue's suggestion so appealed to Sholes that he devoted the rest of his life to the perfection of the typewriter, which he lived to see definitely established and in use throughout the world.

Enter into the picture understanding, sagacious James Densmore, the so-called "father" of these inventors, an engineer who was later to be a typewriter inventor and manufacturer on his own for a time. Years of experience gave him an advantage over them, but he also had keen insight. A practical man endowed with imagination, he is also credited with foresight, energy, unbounded courage, and unquenchable faith in the future of the infant enterprise.

He has just received the first message ever typed. His name doubtless headed the list of the "hundreds" of friends far and near to whom Sholes, Glidden, and Soulé decided to send letters after they awoke one morning to realize with sudden joy they possessed a typewriter model which printed capital letters line after line rapidly and legibly. They were determined to let their friends see what they had achieved. The final test had been a thorough success. (Remington Rand and George Iles say he didn't see the machine till March 1868 when, after looking it over with an indulgent eye, bluntly "pronounced it good for nothing except to prove

the feasibility of an idea," notwithstanding the fact that from the time he received the unique letter till he saw the machine vital improvements had been incorporated and the three were rather proud of it.)

Immediately, claims one source, Densmore recognizes the significance of the invention which has made the letter possible. By return mail he offers to pay off Sholes' mounting debts — all expenses to date — in return for a quarter interest in the machine's future (\$6,000), and then sets out to guarantee that future by furnishing moral as well as monetary support while a series of more than thirty experimental models, each better than the last, were designed and produced by Sholes. The offer amazed Sholes and he accepted it, and Densmore forwarded the \$6,000.

And when the time came to sell to the Remington gunsmiths, it was the fluent, persuasive George Washington Newton Yost, friend, mechanical expert, and former oil-transportation-business associate of Densmore, and later a typewriter inventor and builder himself who was their mouthpiece, however. The inventor was too modest and uncertain of himself to plead his own cause. Not being much of a talker, Densmore had, in his own words, brought Yost along to act as "Aaron to his Moses." Soulé and Glidden had stepped out, so now there were Sholes and Densmore in full possession of the patents. It is said Densmore's suggestions and criticism by others discouraged Glidden and Soulé who disposed of their interests to Sholes and Densmore.

Now these two manfully attacked defects in their model, patiently built about thirty, each with some change, usually intended to reduce friction, heighten speed. Both expected stenographers to be among the first to use it; hence the reason that Densmore saw to it that James Ogilvie Cleph-

ane, a Washington, D. C. court reporter and the man who afterward helped Ottmar Mergenthaler, inventor of the linotype, rigorously tested some thirty (according to *Judy's* magazine) models.

The five or six years' work on these models has been termed the "most remarkable part" of Sholes' whole effort. Certainly it demonstrated patience and tenacity. Clephane was so unsparing in his tests that often he reduced a machine to ruin. His judgments, too, were so caustic that even forbearing Sholes, at last losing his temper exclaimed, "I am through with Clephane!"

Judy's magazine states Densmore would tactfully point out to the inventor flaws. His motives were entirely unselfish. But Clephane's frank reports irritated and disheartened the inventor. Easily discouraged, he was always one to seek sympathetic understanding and encouragement. Always, however, Densmore would persuade him to keep making improvements.

"This candid fault-finding is just what we need," commented Densmore repeatedly. "We had better have it now than after we begin manufacturing. Where Clephane points out a weak lever or rod," Densmore would say, "let us make it strong. Where a spacer or an inker works stiffly let us make it work smoothly. Then depend upon Clephane for all the praise we deserve."

Sholes was intelligent enough, apparently, to listen and take advice. The counsel was heeded. He improved his models in the light of Washington objections. In all, fifty or so were tried before Densmore was satisfied (*Judy* and Iles). Each cost about \$250.00. Each possessed one or more improvements over the last, yet in the hands of practical users Weller and Clephane revealed some defect, broke down under the strain of actual workaday use.

Densmore and Sholes next invited Yost to Milwaukee for his advice as to manufacture and markets. He subjected their latest model to thorough inspection and repeated tests, and after suggesting several minor changes, declared what the machine now needed was precision in manufacture, sent them to Remington.

Chapter IX

DANGER! WOMEN AT WORK

The first machine was finished by 1867. Patented with improvements June 23, 1868, it became patent number 79,265 and was listed as "Sholes et al." It had just eleven visible piano keys and was of wood (see cut). The framework of wood with the leverage below and basket form of typebars above, but probably only in these respects, closely resembles some modern machines. The original model was very clumsy and weighty.

Writing was on a tape of tissue paper, the platen was fastened to the body of the boxlike affair. Writing could not be seen until it was completed, and when the paper was once removed there was no way by which it could be replaced with any degree of certainty that the lines would coincide with those already written. For his first model Sholes used an old kitchen table he found in an attic.

Suspended in a circle under the platen, the typebars were operated by wires connected to the keybars. "Mr. Sholes knew nothing about the optimal arrangement of typewriter keyboards," Dr. August Dvorak, co-inventor of a simplified keyboard arrangement, asserts. "To keep his typebars from colliding, and the connecting wires from crossing," Dvorak goes on, "he arranged the frequently used letters in different quadrants of the typebar circle, and consequently gerrymandered the keys into Sholes' keyboard."

Sholes devised the letters, all capitals, a spacer, and other equally important details. The letters often stuttered or stuck, were unequally spaced and out of line. His outstand-

ing contribution to typewriter development is the fact he continued to experiment until evolving a key system and linkages to the typebars, combined with the universal arrangement of the keys which enabled his self-termed "typewriter" to type rapidly without fouling of the typebars.

Neither he nor his two partners undertook any systematic inquiry into what their predecessors had accomplished, although he did use a ribbon, first introduced by Francis in 1857. Indeed the importance of this development is shown by the fact Foucault (Foucald) in 1849 and Beach in 1856 limited their machines to mere embossing so that their services were restricted to the blind because they were unable to contrive a simple and trustworthy inker. Some typewriters had ink pads. However, Sholes was ready to substitute scarce carbon paper if necessary, now used solely for duplication.

Charles Weller told how in July, 1867 when he, Weller, was a telegraph operator and student of shorthand, Sholes came to him for a sheet of carbon paper. The carbon copy as we know it today was unknown; file and other copies of originals were handmade or printed on a copy press. As a result of their failure to research the inventors lost time, wasted energy designing novelties that worked badly instead of utilizing what had already been developed.

Edward Ringwood Hewitt, in his reminiscences *Those Were The Days* (Duell, Sloan and Pearce, N. Y. 1943), said that as with Edison and Bell and their inventions, Sholes brought his first typewriter to his grandfather, New York's Peter Cooper, the builder of the first American locomotive and the founder of Cooper Union. "It was a poor affair, in a square wooden box," he writes. "It wrote badly and seemed to be so complicated and expensive to make that Peter Cooper did nothing about it. The typewriter was not developed to a practical point until years later."

And early in the seventies Sholes, accompanied by a friend named Craig, went to Thomas Alva Edison's shop in Newark for help on his invention. "The Wizard" was able to give him some very valuable assistance. He improved it mechanically.

Actually Edison did some typewriting inventing of his own. According to R. J. Scott, he made the first practical *metal* typewriter. Moreover, his patent of December 10, 1872 for an electrically operated traveling wheel device (U.S.A. patent number 133,841) was the forerunner of the stock ticker printing machine of today. Edison found an early use for typewriters in automatic telegraphy.

Mark the date of June 23, 1868 well. It is an important date in history. And, mind you, it took more than 150 years — from Mill's day — to reach this historical threshold. And too, as Gertrude C. Ford points out, it was to take another fifty years before the typewriter would participate in the economic and social revolution known as the change from the "Machine Age" to the "Power Age." A national day of emancipation for women, it has been called. And the ladies' Abraham Lincoln in this case — Christopher Latham Sholes.

Lucretia Mott and Elizabeth Cady Stanton had been leaders in the movement demanding legal and political rights for women that dated as far back as 1848. "Votes for Women!" was Mrs. Stanton's battle cry. Susan B. Anthony maintained the right to vote was only part of the general emancipation from restrictions placed upon women, though even the most ardent feminist must admit that thus far the typewriter has enabled more women to escape the drudgery of the home and be placed on a nearly equal status with men than the Suffragettes, the Lucy Stoners, the Amelia Bloomers (nee Jenks, born 1818, died 1894),

the Carrie Chapman Catts and the others combined.

For from typing it was a natural step to general secretarial and office work, and thence into almost every branch of business and industry. Sholes was always glad he was the one who wrought such a service to womanhood.

"I don't know about the world, but I do feel," he said shortly before his death when a daughter-in-law observed to him what a wonderful thing he had done for the world, "that I have done something for the women who have always had to work so hard. This will enable them more easily to earn a living."

"Whatever I may have felt in the early days of the value of the typewriter," he wrote in one of his last letters, "it is obviously a blessing to mankind, and especially to woman-kind. I am glad I had something to do with it. I builded wiser than I knew, and the world has the benefit of it." Thus wrote one of the great inventors of the 19th century.

It was in the New York Y.W.C.A. in the year 1881 that a group of eight young women was graduated from the first course conducted for feminine typists from what later became known as the Ballard School. Herkimer asserts the first school to teach typing opened in 1878. Subjected to constant ridicule, they, nevertheless, soon had their new domain under control.

A subsequent "Sholes et al" (Sholes and Glidden; — Weller claims also Soulé as does U.S. National Museum) patent was issued July 14, 1868, patent number 79,868. It was described as "a new and useful improvement in type-writing machines." Also, a single Sholes patent representing additional improvements is number 118,491 under date of August 29, 1871.

Glidden and Sholes' "type-writer" was exhibited in New York City in 1871 and 1872 but attracted little attention. The early models were made to be locked when not in use.

For the July 14, 1868 machine four things were claimed by its three inventors: a circular annular disc with radial grooves and slots to receive and guide the typebars so they struck the center; radial typebars to correspond with this disc; a ratchet to move the paper carriage by the breadth of a tooth when a key was struck; and a hinged clamp to hold the paper firmly on its carriage.

Weller, in his 87-page book *The Early History Of The Typewriter* doesn't refer to the machine of June 23, 1868 patent, but speaks of the "first machine" as that of July 14, 1868 patent. From all indications it was the first working model sent out from Sholes' shop for testing by someone other than himself. It was so constructed that the tissue writing paper thought necessary was held in place by a flat frame.

A visible machine, it was made so by having the type strike the paper first and getting its impression through it from the inked ribbon passing underneath. Introduction of the roller brought with it loss of the visible feature but made possible use of paper of any thickness, for a little late Mr. Sholes, laughing, discovered all that was necessary was to put the inked ribbon next to the type instead of between the paper and the platen.

The typebars were pieces of straight brass with the letters cut on the ends that were wont to bunch together in the slots at the striking center. But then there were happy periods when everything worked just beautifully and "greased lightning" was an understatement with regard to speed obtainable.

When a ribbon wore out you bought a bolt of silk or satin, unrolled and dipped it into black ink, then strung it out to dry, as a rule on the backs of the office chairs.

Second model received by Weller came in the fall of 1870. It was a great contrast to the first although differed in

size only an inch or two from models in existence at the time, Weller wrote in 1918. (Sholes was always striving to reduce the overall size to the practical minimum.)

Its iron frame was enclosed at the sides now with thin, polished wood boards, and it had a rubber roller twice the circumference of our present-day ones. The roller movement in printing and changing the line was exactly the reverse of modern machines however. But gone was the troublesome clockwork mechanism with the lead weight for rewinding, which controlled the movement of the paper frame and ribbon. Sholes had substituted the spring motor.

Weller always regretted that the July, 1868 patented machine, which he called the "first machine" you remember, was never preserved intact. He said the others made during that experimental stage were undoubtedly dismantled and discarded, except for those parts that could be worked into other machines.

Chapter X

THERE'VE BEEN SOME CHANGES MADE

For five or six heartbreaking, effortful, struggling years Densmore sought a manufacturer. One heartbreak was Sholes' alleged necessity of sacrificing his own little home to raise more money after all his private funds were exhausted. This step presumably followed that of first mortgaging the property.

Late in February 1873, armed with the 1873 model, he and Yost came to the Remington Works. Not till this time was the machine deemed sufficiently perfected for actual manufacture. Amount of labor performed and money expended thereon had been, in Sholes' words, fearful to contemplate, while the number of mortifying failures encountered, too numerous to mention.

The great effort was finally rewarded and on March 1, 1873 a contract was signed with Eliphalet Remington and Sons Company, Ilion, New York gunsmiths for the manufacture of a thousand machines (until 1876 for Sholes and Glidden, later solely as a Remington enterprise). The Sholes and Glidden typewriter became the Remington No. 1 in 1876.

(R. G. Dun and Company, predecessor to Dun and Bradstreet, in 1873 gave Sholes his first order — 100 machines for \$5,500.)

The experimental work of Sholes and his associates between 1866 and 1873 had now paid off by inaugurating the modern development of the typewriter. (The new manufacturer is also referred to as Remington Arms Manu-

facturing Company and the Ilion Arms Manufactory, but is now Remington Rand, Inc.) But in abandoning his "baby", Sholes was sad.

Ilion is a town not far from Seneca Falls, *The Peirceanian* newspaper points out, where in 1848 Lucretia Mott and Elizabeth Cady Stanton initiated the American Suffragette movement. "Thus American feminism from the outset," the paper goes on, "was associated in some degree with the typewriter and also with classical literary allusions, as witness Ilion and Seneca."

The Remington gunsmiths eventually acquired full ownership, the *Dictionary of American Biography* infers, for \$12,000.00. However, as has been explained before, Sholes got this amount from Densmore in exchange for the former's royalty rights. It was a goodly sum for those days and the only reward so far as is known for his "priceless" invention and his years of labor, worry, anxiety, discouragement, and tenacious struggle.

Sholes and Densmore consented the typewriter should be called the "Remington." It had been put together by amateur mechanics. It had been developed under the fire of an unrelenting critic. It had been examined and altered by a distinguished inventor. It was now to undergo standardization in, and distribution from, a great modern factory under mass production methods. No longer would it be like trying to make a watch in a blacksmith shop. However, it would take nearly ten more years.

Thus it was that because a Pennsylvania printer's "devil" became tired of writing his name in longhand, a needy world received at last the writing machine that British Henry Mill had dreamed about — and forgotten.

Little is known of Sholes after he disposed of his patent rights, except that with the help of his "two sons", Louis

and Zalmon (he had five, three of whom invented), he continued to make typewriter experiments, constantly simplifying the design and lightening the touch, giving all of the results to Remington. Such liberality was characteristic of the man. One writer termed it his "excessive tenderness of conscience."

It was the Remington Company which marketed this first really practical typewriter — in 1874. Thus the typewriter industry, Sholes the responsible agent, was born. Actual manufacture started September 1873 and the first model No. 1 Remington was shipped from the factory in the little Mohawk Valley village of Ilion early the next year, with Philo Remington, president of the company, manufacturing the first commercial typewriter. Only about 400 were sold that first year of 1874.

But first factory mechanics are credited with having made several important changes. William K. Jenne supervised these. He was the dean of typewriter builders by virtue of thirty years of subsequent experience. Like Sholes he came of good New England stock. Practical Henry Harper Benedict, of the sewing machine department of the company, is also mentioned as having been assigned the duty of constructing the new typewriter. J. M. Clough and B. A. Brooks also provided many detailed improvements.

The first Remington, in truth, did resemble a family sewing machine, with a foot-treadle to operate the carriage return. Again it was the *Grit* which said, "The result was not recognizable as the child of the inventors." True, it was still clumsy and awkward but from it the great majority of the typewriters of today have been directly developed.

Mark Twain, having purchased one of these first Remingtons, became the first author to submit to a publisher a typewritten manuscript. (He also claimed to be the first

person in the world to have a telephone in his house for practical purposes.) The first living characters created on it were his Tom Sawyer and Huckleberry Finn, the book being *The Adventures of Tom Sawyer*.

Even Twain, incidentally, contradicts himself on this point. His *Autobiography* based on memory is authority for the above. But a much earlier letter proves that his first type-copied manuscript was *Life On The Mississippi*.

Anyway, he is thus the first of a now long line of literary celebrities to use a typewriter, or "a curiosity breeding little joker," as he described it in a letter written at Hartford March 19, 1875. His first letter was also written at Hartford: to his brother December 9, 1874.

Twain's \$125 machine did Gothic and "sufficiently ugly" capitals only. More than thirty years later he changed his opinion of the improved typewriter saying, ". . . But now it is the other way about: the person who *doesn't* own one is a curiosity . . ."

He gave his first machine away and got it back three times before he succeeded finally in saddling his coachman, Patrick McAleer, with it. As soon as Patrick got wiser, however, he "traded it to a heretic for a side-saddle which he could not use," and there Twain's knowledge of its history ended.

Count Tolstoi, Lord George, and many crowned heads early used the typewriter. His Holiness, the late Pope Pius XII, was the first pontiff to use the machine, typed accurately.

Thousands, including my grandfather, saw it for the first time at the Philadelphia Centennial Exposition of 1876. Two of the greatest inventions of modern times, the typewriter and the telephone, made their first public appearance on this occasion. But how different their receptions at the

hands of the public! There was an emperor present when Bell introduced his invention. Cable dispatches and newspaper headlines heralded the achievement.

On the other hand, scarcely noticed on exhibit in the same building was the typewriter, the other new invention that was destined to rival even the telephone in the magnitude of its service to the world. The machine, now in the Remington historical collection, was especially groomed for the occasion. But its mother-of-pearl finish neither dazzled nor convinced the public.

In fact the public was painfully disinterested. They came in fair numbers and many of these were curious. But it was curiosity mingled with some ridicule and very little serious interest. Very few machines were sold and about the only revenue derived by the exhibitors was from samples of typewriting sold as curios for twenty-five cents each.

Like a whirlwind, though, it was destined one day to sweep the country — and the whole world. Many attachments for increasing efficiency and extending the scope of work of the typewriter have been made, but none has changed the principle upon which the original machine was constructed. It was this principle upon which the first commercially successful writing machine was based. Sholes' machine was the truly great success.

There are two successful types of machines—the “basket” and “cylinder”—although the latter is little used. According to their operating principle typewriters are divided into two classes, the rotating segment or typewheel machines; and the typebar machines, and it is interesting that the germs of each of these principles were embodied in two early devices: Burt's of 1829, and the Frenchman's, Xavier Progin (Projean), of 1833.

That the performance of the latter was slow is evident from its inventor's own description: It will print “ALMOST

as fast as one could write with an ordinary pen." An outstanding improvement was the introduction of the first practical noiseless typewriter invented in 1913 by nervous, foresighted Wellington Parker Kidder, a maker of printing presses.

Original models contained features still standard today. They included the paper cylinder with its line spacing and carriage return mechanism; the escapement, which causes the letter spacing; the arrangement of typebars so as to strike the paper at a common center; the actuation of the typebars by means of keys and connecting wires; the printing through an inked ribbon, and the position of the different characters on the keyboard.

But the machines had no shift-key mechanism and printed all capital letters. They worked on the type-bar principle but at first each of its forty-four bars carried a single character only. Hence all writing was in capitals, and the operator was not able to see what he was writing without stopping to turn the rubber roll, or platen, as it is technically known.

Not till 1878 was the problem of printing both capital and small letters solved — by placing large and small type on a single key and shifting them with a shift-key mechanism. This Remington did through the cylinder shifting device of Lucien Stephen Crandall, and the double types, a capital and small face of the same letter mounted on the one type bar, invented by Byron A. Brooks.

That year of 1878 typebars with two types were introduced, so that a machine with forty keys, two being change-case (i.e., shift-key) keys, could print seventy-six characters with both capital and small letters. The machine that accomplished for the first time the writing of both capital and small letters was the model No. 2 Remington.

G. W. N. Yost, with his Caligraph, also claimed to be first in this, according to James H. Collins, but the London *Handbook of the Collection Illustrating Typewriters* associates the year 1883 with the Caligraph. Anyway, the Caligraph had a full keyboard of seventy-two keys. By 1886 Remington's typewriter enterprise had expanded to such a degree that the firm set it up as a separate business.

The great majority of modern typewriters are worked from a keyboard. A few are not; they are known as "index machines." Though there are numberless differences in detail, all typewriters apart from the index machines, bear a general resemblance to each other in their mechanical arrangements.

Really essential operations may be reduced to two: The machine must print a letter when a key is struck, and it must have a device by which the paper may be moved a short distance to the left with each stroke in order that the letters may be printed separately and not one on top of the other.

Yes, the modern typewriter represents the achievements of many years of trial and invention. Two outstanding achievements are the musical keyboard of over fifty musical notes and symbols, and keyboards representing practically every civilized language. Naturally these latter keyboards vary to fit the peculiarities of the many tongues. Russian typewriters, for example, lack some of the keys our machines possess. The Russian market, with a machine especially equipped to write Russian characters, was entered in 1885, the German in 1883, etc. An English typewriter has two rows with a total of only twenty-nine keys.

Lin Yutang was reported in October, 1945 as being busy on a Chinese typewriter that would be capable of 50,000 different characters or words with a keyboard of just sixty-



MRS. CHARLES L. FORTIER, FORMERLY LILLIAN SHOLES, SEATED AT A
MODERN REMINGTON TYPEWRITER, 1938.



LILLIAN SHOLES, THE FIRST TYPIST, SEATED AT ONE OF HER FATHER'S EARLY MODELS IN 1872, WAS PROPHETIC OF THE MILLIONS OF WOMEN WHO WERE TO EARN THEIR LIVELIHOOD IN THIS WAY.

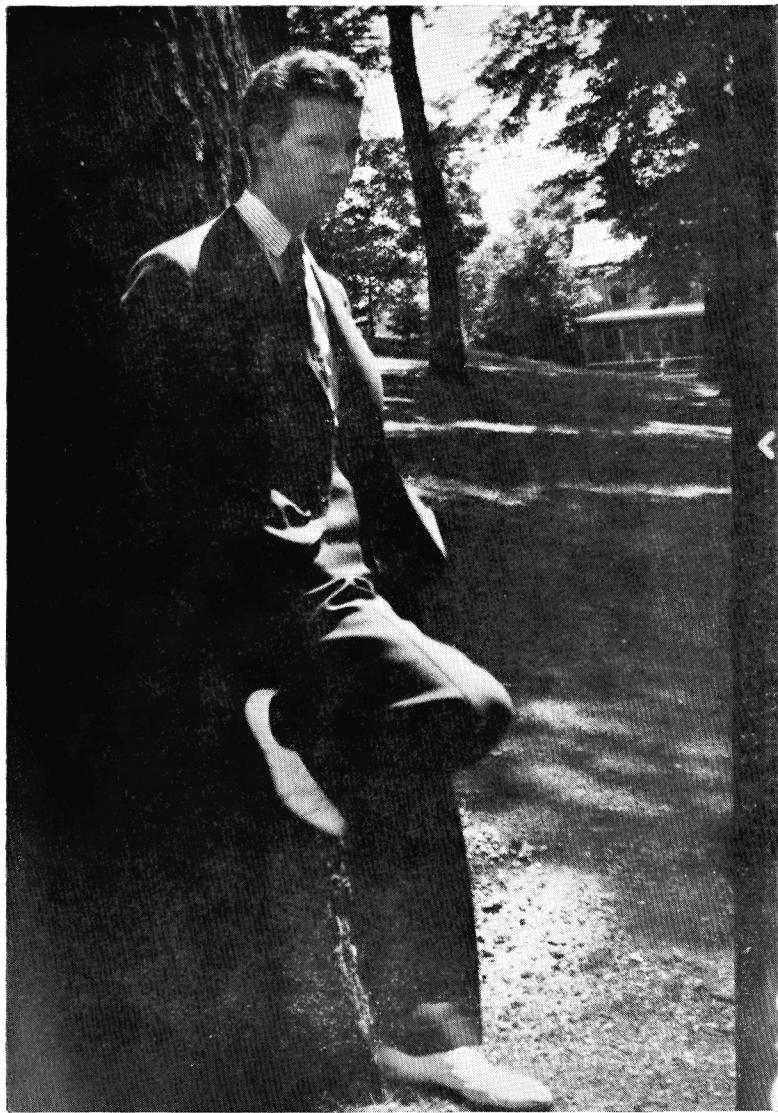
Photograph courtesy Remington Rand, Inc.



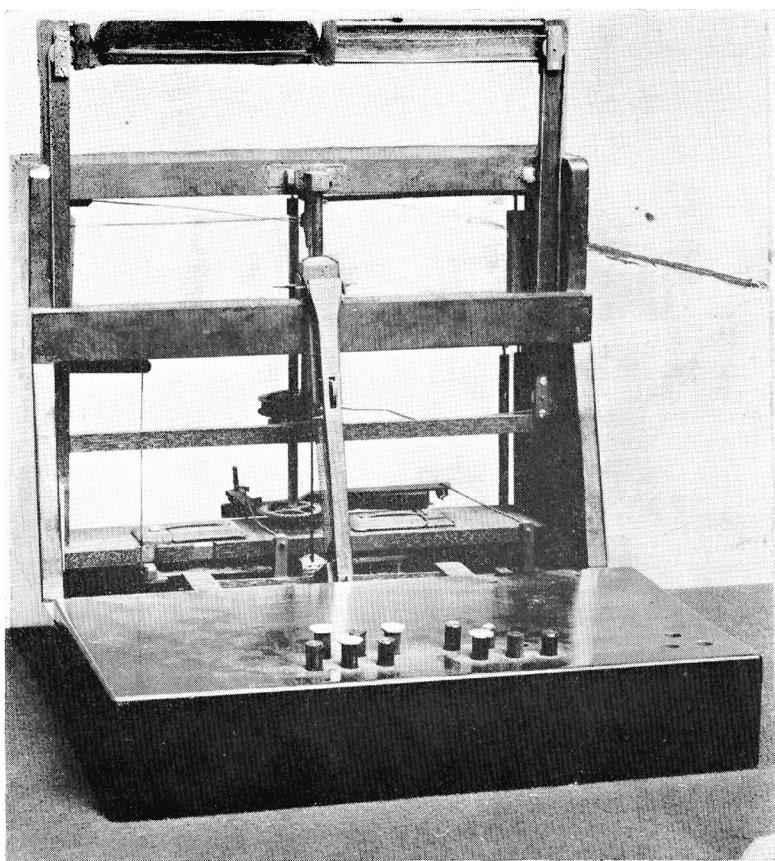
PHOTOGRAPHIC REPRODUCTION OF A WATERCOLOR PORTRAIT
OF THE AUTHOR BY HIS BROTHER, ARTIST RALPH TOYE FOULKE.



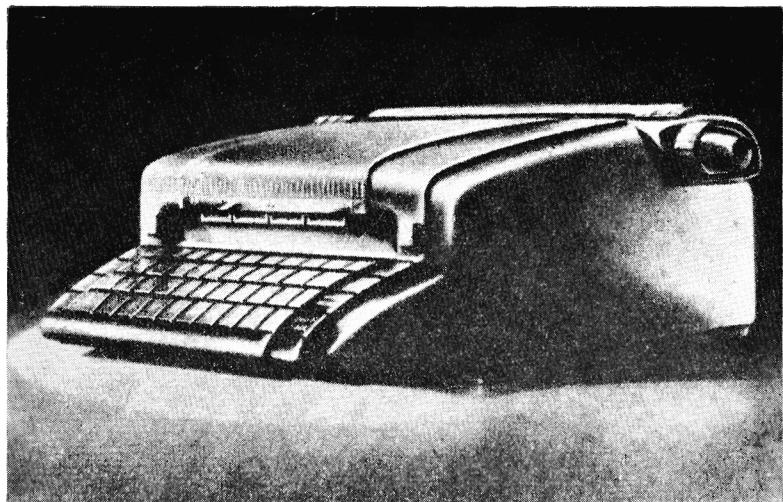
PHOTOGRAPHIC REPRODUCTION OF AN OIL PAINTING OF PART OF THE "SHOLES FARM" IN LIBERTY TOWNSHIP, DANVILLE, R.F.D. NO. 1, MONTOUR COUNTY, PENNSYLVANIA SHOWING ARTIST RALPH TOYE FOULKE'S CONCEPTION OF THE LOG-HOUSE IN WHICH SHOLES IS SAID TO HAVE BEEN BORN. THIS TRACT IS ONE AND A HALF MILES FROM MOORESBURG, FOUR MILES FROM DANVILLE. SURROUNDINGS ARE SIMILAR TO THOSE OF SHOLES' DAY. ORIGINAL IS DISPLAYED IN THE DANVILLE MUSEUM.



PHOTOGRAPH OF THE ARTIST, BY THE AUTHOR



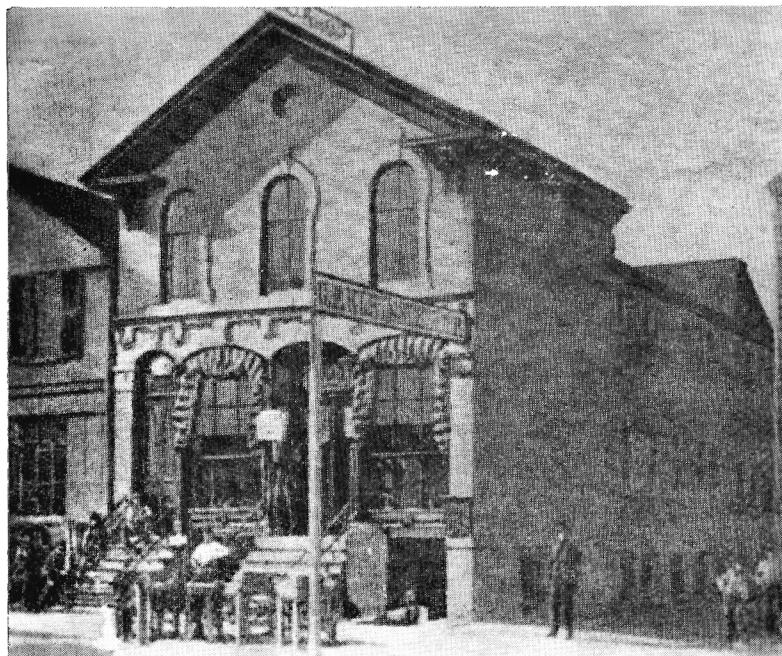
JOHN PRATT'S "PTEROTYPE"



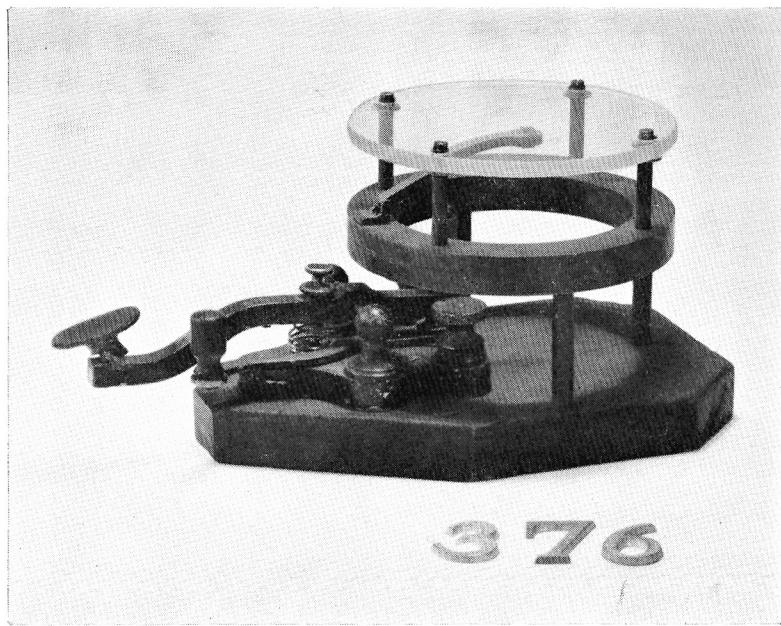
STREAMLINED TYPEWRITERS OF TOMORROW MAY BE ELECTRICALLY OPERATED AND SELF-LIGHTED. DESIGN OF ONE SUCH BY DAVE CHAPMAN.



"THE TYPEWRITER WILL RENDER OBSOLETE THE SCHOOLROOM COPY-BOOK FOR THE CHILD IN LEARNING HIS FIRST LESSONS." NOWADAYS CHILDREN WITH DEFECTIVE EYES LEARN TO OPERATE TYPEWRITERS ON MACHINES WITH OVERSIZE TYPE.



THE BIRTHPLACE OF THE TYPEWRITER: KLEINSTUBER'S MACHINE SHOP IN MILWAUKEE WHERE SHOLES INVENTED THE TYPEWRITER.



PRINT OF THE ONE-LETTER SHOLES EXPERIMENTAL MODEL AS REPRODUCED BY GEORGE P. JOERGENSEN, MILWAUKEE MUSEUM TECHNICIAN. THE "376" IS A PHOTOGRAPHER'S NUMBER.

Milwaukee Public Museum photo, courtesy Remington Rand, Inc.



MISS STELLA PAJUNAS (1946) – WORLD'S CHAMPION TYPIST AND THE IBM ELECTRIC TYPEWRITER ON WHICH SHE WON HER CHAMPIONSHIP.

five keys. He had pondered same these many years. In an advertisement of his book *The Gay Genius* November 2, 1947 he was pictured sitting before "his newly invented Chinese typewriter" which looked very modern.

To satisfy people who wanted machines which would write in more than one language, inventors provided them with removable typeplates — all the letters of a given language on one plate or wheel. To change a language or even a type size requires but a minute.

The typewriter writes in every language but one, including Jewish, which reads from right to left. There's no Greek keyboard, though most other countries long ago standardized arrangements. Braille and other codes replace ordinary characters, and electricity is used to lessen toil of manipulation. (By now a Greek keyboard may exist.)

There have been some eighty-five English, French, and American patents granted for typewriters, states one source. Compare that fact with Andrew Geyer's statement that up only until the time the trade paper *Geyer's Topics* was established in 1905, a total of 2,678 patents on typewriting machines had been issued by the United States Patents Office alone. This would include the Underwood of course, patented April 27, 1893 by the skilled German mechanic, Franz X. Wagner.

Representing more than eight patents including those of July 15, 1890; August 4, September 6 or 8, 1891; April 12, 1892 and others, and in good condition, for instance, is an old Blickensderfer No. 7 (better known as the "Blick", a typewheel machine) made in Stamford, Connecticut. A James O. Jacobs, of Selinsgrove, RD No. 1, Pennsylvania owns it.

George C. Blickensderfer was born in Erie, Pennsylvania. His name is memorable for it was carried on the first really

practical lightweight typewriter produced in quantity. He was the inventor and maker of the first portable typewriter. His was the first machine with a traveling bag for ready portability. Also, it was one of the first moderately priced typewriters.

Like the Hammond the Blickensderfers at first had the "ideal" keyboard but changed to the "universal" to meet popular demand. Actually, a hundred different keyboards were available through an equal number of different type-wheels, accounting in part for the machine's popularity in so many countries. In some countries, France for example, it sold as the "Dactyle." Early in this century Blickensderfer also made a promising, if costly and complex, electric typewriter.

Chapter XI

DVORAK SIMPLIFIED KEYBOARD

A new typewriter keyboard so revolutionary that apparently any operator can type on it at great speed on October 7, 1943 enabled a Navy Department typist (name unknown) in Washington to zip along at 180 words a minute, according to the Associated Press.

That it was the keyboard on "one of the Navy's new typewriters" and not the typist responsible for so decisively bettering the world's speed record of 149 was evidently shown by the fact that the A.P. account didn't even give her name. It did say she "looked nonchalant and a little bored" as she beat "a smooth tattoo", which might be taken to indicate further that probably any good typist could have done the same.

Designed by Lieutenant Commander August Dvorak, during War II the Navy's top expert on time and motion study (no relative of composer Dvorák, but formerly professor of education at University of Washington), the new arrangement is supposed to represent the first major keyboard change since the machine was invented, dividing labor 44% for the left hand and 56% for the right.

However, the Navy Department, in a letter to the author October 14, 1943 by Lieutenant Commander W. Marvin McCarthy, said it had no record of and did not conduct such a speed test, and denied having made an official announcement to that effect. The Navy did reveal, said *Business Week* in its October 16, 1943 issue, that only fifteen girls were trained in the revised letter arrangement, that

thirty-two typewriters equipped therewith have been put in storage because typists shied at learning something they couldn't use on Standard machines after War II (but see information on conversion and trade-in below). The speed was not 180 but 108. This is still much faster than any speed achieved on Standard keyboards by its typists, a fact the Navy does not back water on.

The Dvorak-Dealey simplified typewriter keyboard has enjoyed nothing but praise since it was copyrighted in 1932 and patented four years later. Scientifically designed by Drs. August Dvorak and W. L. Dealey at the University of Washington, it was inspired "a few years prior to 1938" by a master's degree thesis on typing errors by Gertrude C. Ford. "The fruits of research in psychology and education were drawn upon in connection with its design."

As a result of the scientific location of dominant letters and their sequences according to the most frequent language patterns, this new arrangement is compared to other social advances in the typewriting field like touch and visible typing, and the noiseless feature. It is essentially an easier method of typing.

Miss Ford states (*Proceedings of The National Office Management Association*, 1938) that "historically the urge for its birth goes back to the turn of the century when the typewriter companies were seeking ways to popularize typewriting in schools and business houses through contests." Principal change from the Standard is in the relocation of most of the letters, figures, and special characters so that they may be typed more efficiently. Only two letters, "a" and "m," are in the same position on both the Dvorak and Standard boards. Spacing between letters is still accomplished by thumb stroking.

Although the reach to the upper or third row, for example, is just as long as it ever was, the number of times

needed to reach is reduced from 52% on the Standard to 22% on the simplified. Similarly, the number of reaches to the lower row is reduced from 16% to 8%. The home row (second row from the bottom, where fingers naturally rest) gets 70% of the typing instead of 32%, as on the Standard keyboard.

This home row comes in for the bulk of the letter combinations. Thus fatigue is lessened and postponed. On the simplified the figures more frequently used are given to the strongest fingers. The odd figures are taken by the left hand, the even by the right.

This evens up finger loads, makes rhythm possible in typing numbers, a thing never possible on the Standard. Also, all the vowels are on the home row and are taken by the left hand; on the Standard, only one vowel is on the home row: "a".

The Standard keyboard, designed for one-or two-finger typing overloads the commonly weaker left hand, overworks those one or two fingers, and underworks the others.

"Touch typing" eventually took the place of the two-finger, "hunt-and-peck", unequally distributed method but Sholes' board, with minor changes, became and remains today the Standard typewriter keyboard, and until this 1932 innovation no other ever really challenged its preëminent position.

"The one new variable is in the scientific location of the letters with reference to language usage, but the actual keys themselves still remain in their same positions as on the Standard keyboard." Present old keyboard machines may be converted to the simplified keyboard in local typewriter shops by changing the key cards or keys and removing and resoldering the type heads on typebars to correspond to the changed keyboard arrangement. Another method is to remove the typebars and have them retyped at the factory.

Awkward reaches and hurdles across rows are eliminated. Hence the typist's output and speed of work are materially increased without corresponding fatigue. It is more accurate, more rapidly done than on Sholes' Standard of 1868, which underwent minor changes itself. Dvorak believes that around \$10,000,000 to \$20,000,000 will be saved each year nationally by all concerned through the use of this new keyboard.

It is now available on any typewriter. And it costs as little as \$5 to convert a Standard to a simplified keyboard. The price varies from \$5 to \$15 or more (prior to Pearl Harbor it was \$10 to \$15), depending upon geographical location, and it is recommended that advanced notice of about two weeks be given service managers. But trade-in rather than conversion is advocated. All companies manufacture the new keyboard, the first ones being made in 1932 and 1933, and for it there is no extra charge. Before the war, that is.

In the past dozen years these companies have built a few thousand machines incorporating it, will be glad to build more as manufacture prohibitions are lifted and if they get orders in sufficient quantity at any one time. They point out that there are more than 5,000,000 Standard keyboards in daily use, that Dvorak is only one of many inventors of "scientific keyboards" who have been consistently stymied by the gargantuan job of rebuilding them and retraining their operators. The general adoption of the simplified requires the cooperation of employers and teaching institutions.

Time magazine, in the educational section of its March 20, 1939 issue, said in part:

"More than ten years ago Dr. August Dvorak . . . invented a new typewriter keyboard which he proved was

faster and less fatiguing than the old standard keyboard designed in 1868 . . . But so far only 1,000 machines with the Dvorak keyboard . . . have been sold. Dr. Dvorak had about despaired of teaching old typists new tricks when last week University of Chicago reported remarkable success in teaching the Dvorak system to children.

"In the University's demonstration elementary school, pupils are taught typewriting from grades five to eight as a means of improving their English, spelling and composition. Teachers announced that children learned typing twice as fast on the Dvorak keyboard, were able to exceed fifty correct words a minute (par for professional: seventy words).

"Dr. Dvorak concluded that the old keyboard needed reforming when he found that high-school typists often misspelled easy words (such as "on", "which") because they had to make awkward reaches and hurdles with their fingers to type them. He also found that in normal writing typists struck keys in the home row . . . only 32% of the time, that the left hand did 47% more work than the right. Sample one-hand word: greatest.

"In the simplified Dvorak keyboard, all the vowels and punctuation marks are struck by the left hand, the most frequently used consonants by the right. Thus no word or syllable can be written by the right hand alone, very few by the left alone . . . Dr. Dvorak claims that university students can attain fifty words a minute in one semester on his keyboard (months sooner than on the standard keyboard), that misspellings decrease. Last week the Chicago results gave him new hope."

In 1938 some 10,000 typists knew and used the new board. Many students have learned it for their own use in three to six months. It may be learned within five to ten

weeks, depending upon the amount of time devoted daily to retraining.

"Two outstanding performances were once made by Miss Lenore Fenton, who transcribed from dictaphone at 108 net words per minute for thirty seconds, and by seventeen-year-old Miss Velma Crismon, who typed at 128 net words per minute in the fifteen-minute Open Schools typewriting event." *Business Week* magazine on October 16, 1943 declared that Miss Fenton, who has held as many as eleven international typing records, once achieved 180 words.

A Dr. Roy Hoke also designed a reformed keyboard.

Chapter XII

THE U. S. LEADS IN MANUFACTURE

The United States leads the world in manufacture and supply of typewriters, nearly half the factories being located in New York and Connecticut. In 1937 more Remingtons were built and sold than any other make. Today nearly a million typewriters are produced annually. As of today more Remingtons have been bought than any other make. A lucky few hundred thousand — in the armed forces, war plants, and essential industries — during the war were typing on Remington Model 17, a brilliant performer.

The huge typewriter enclosed in glass and suspended above a Hartford street is believed to be the largest. The first and second working models, one of the first commercial machines, and also one of the No. 1 Remington models without stand are on display at the Smithsonian Institution, Washington, D. C. Incidentally, a typewriter and stand surmounts a clerk's grave as a war memorial in the Italian battlefield cemetery at St. Elia Hill near the Isonzo River.

The industry has continued to grow so that even in 1923 the annual output exceeded \$7,000,000 in value. The Julius Bien Photolith Company of New York in 1886 reported 23,000 machines manufactured annually with 152 patents having been granted by the United States. The value estimate for 1929, the crash year, was \$58,774,220. Of course, during the war the figure was probably much higher, halted production by the government and restrictions of sales to civilians notwithstanding.

The typewriter industry as of October 31, 1942 ceased making machines entirely in favor of war work. "From typewriters to machine guns!" was a slogan used to describe the change-over. On that date it devoted itself 100% to the fabrication of guns, precision parts and the like. The click of the typewriter gave way to the rapid staccato of the machine gun. It is thus wryly ironical that in suddenly converting to direct military production, it at once deprived the Army, Navy, and civilians alike of needed typewriters.

Radio listeners early in the year 1943 were made aware of the shortage of typewriters by the government's repeated offers over the air of cash for good used civilian machines. As late in the war as March 25, 1943 insistent efforts on the part of the U.S. Treasury Department purchasing agents were still being made to obtain typewriters for the federal government, according to reports from schoolmen.

In fact a circular letter by Dr. Francis B. Haas, then Pennsylvania State Superintendent of Public Instruction, is typical of those letters and repeated visits by the procurement agents initiated at the behest of federal agencies. Regarding his letter one supervising principal in a Northumberland County (Pa.) school district on March 25 had this to say, by way of reply to persistent written requests concerning it:

"It is possible that I received a letter from Dr. Haas concerning typewriters. It is just as possible that I put it into the wastebasket . . . I reported some months ago that we had no typewriters to sell. We do not now have enough machines and never did have enough."

Nevertheless this campaign produced some results. By December limited production of typewriters for the exclusive use of the Army, Navy and Maritime Commission had

been authorized in non-critical labor areas. The Royal plant, being located in a critical labor area, was not authorized to resume production. Post-war planning on the part of Underwood, Elliott-Fisher Company that month was being built on the assumption that it would start manufacturing typewriters the moment relieved of the job of making equipment desired by the government. But on December 16 the company was still not in a position to state when that time would be.

Remington Rand on December 6, in answer to our question, revealed that the company was again manufacturing a small number of typewriters — strictly, however, for government use. The company couldn't predict then how long it would be before allowed to manufacture for civilian consumption. A short time prior to December 15 L. C. Smith & Corona resumed manufacture of "a very limited number" of typewriters under a War Production Board authorization. But this authorization was limited to the period ending March 31, 1944. Whether or not production would be increased, decreased, or discontinued after that was not known by Vice-President Victor H. Davidson in December.

News of exclusive production of their normal peacetime products came July 1, 1946 when Davidson announced decontrol on delivery of new typewriters except "of course" in cases of government emergency needs where the office of civilian production administration "can still put special delivery ratings on our orders which gives the government immediate delivery of such typewriters, if available." As of that date Corona had suffered no work stoppages and while they were very much oversold, were making good production progress.

In the public service radio program "Washington Reports on Rationing" of December 5, 1943 the question, "Is

typewriter rationing being eased up?" was answered in the affirmative, and two reasons why were given:

"Decreased Government requirements for used typewriters, and limited manufacture of new machines. Now, all models of *used* typewriters — both portables and standards — including the most recent, may be *rented* without ration certificates. Also, *portable* machines built before 1941 now may be bought ration free. Limitations on sales of standard typewriters also have been loosened. Your dealer or ration board can give you full details."

Presented by the Council on Candy as Food in the War Effort, an organization sponsored by the National Confectioners' Association, this program was broadcast over N.B.C.

Rationing of all *used* typewriters and new machines in the hands of dealers was ended Saturday, April 22, 1944 by ruling of the Office of Price Administration. *New* typewriters in manufacturers' stocks were not affected by the order and continued to be controlled by the War Production Board.

The Underwood Corporation told the author in a letter July 12, 1946 it hoped to be in full production "very shortly"; that it recently released its new model typewriter, the so-called "Rhythm Shift Machine"; that to counteract the great difficulty in securing castings the company was substituting "a distinctive structure" wherever durability wouldn't be thereby sacrificed, but did not go into detail.

On July 23, 1946 Remington Rand Inc. announced "We are indeed in 100% production in all of our typewriter lines, . . ." including the new Keyboard Margin Control (KMC) feature, which for the first time on any typewriter enables the typist to set right and left margins from the keyboard. A red stamp on Remington's outgoing envelopes in

July, 1946 read, "For the First Time on any Typewriter . . . Keyboard Margin Control."

Trademarked KMC works simply: position the carriage for the desired left margin and set by flicking the KMC key. To clear, hold down the key, move carriage to right limit. Position carriage for wanted right margin. Push down right-hand KMC key. Clear by again holding down the key and moving carriage to the left limit. On the new Remington the warning bell rings six spaces before the right margin is reached. The keys lock after the six spaces, but a flick of the margin release key permits typing right to the end of the carriage.

As with other American businesses in July, 1947, generally speaking the market for sale of typewriters was very good but there were slowdowns in production and therefore delivery as a result of material shortages.

L. C. Smith & Corona Typewriters, Inc., through Victor H. Davidson, reported a big backlog of orders; no work stoppages due to lack of raw materials, strikes, etc. however; the existence of no governmental controls affecting production and distribution; and the continuing sale to the government, same as in "normal" times, of "some" of the company's output.

Mr. J. A. B. Smith, commercial engineer of Underwood Corporation, on July 11 stated his company was not quite in 100% production of typewriters but coming fast, and the government was still ordering. There was no suspension of work, only slowdowns due to deliveries, and the "present market for sale — excellent."

"Current production," said Advertising Manager Ellis G. Bishop of Royal Typewriter Company, Inc. July 15, "is devoted entirely to civilian use and there are not existing controls by the government on typewriting distribution." He

added that there had been very little work stoppage since the war in fact "because of negotiations with labor"; and shortages, due to lack of materials, "have been overcome." The July market for Royals was at an all-time high.

Remington Rand Inc., "the first name in typewriters," in July 1947 was selling to business, private users, and the government, according to the firm's Dan B. Sedgwick. Certain plants were on strike early in the month but this fact "didn't affect the present market for typewriters," Mr. Sedgwick said. Moreover, the newspapers of July 28 reported the strikes were being settled.

Above report on the postwar status of the four major typewriting companies was made possible from answers to four questions the author put to them. These questions concerned present percentage of production, the existence or non-existence of controls affecting deliveries, work stoppages due to scarcity of raw materials or strikes, and the state of the present market.

(However, with the arrival of December 1948 conditions were such that manufacturers of typewriters were laying off their workers. On March 11, 1949 production at the Syracuse plant of Remington Rand, where once 1,500 employees made the Model 5 portable, ceased. For no specific reason the company was to transfer operations to Hillington, Scotland.)

International Business Machines Corporation early in 1946 announced with illustration the 1946 Electromatic typewriter, which produces letters of distinguished appearance with a minimum of physical effort on the part of operator. At that time they were on display in IBM offices in all principal cities throughout the United States. On them twenty carbon copies can be produced with feather-light touch. Experts used to think that only with flat writing

with a frame (as against roller platen) could twenty or thirty good carbons be secured.

The Williamsport, Pa. *Grit* newspaper in a feature story early in 1947 on war-blinded Clarence E. Stubert told of his efforts toward a college degree in the use of a novel, fifteen-pound, portable Braille typewriter with just six keys, corresponding to the six dots on which the sixty-three characters of the Braille system are based.

An improvement in the electric typewriter, and applicable to any or as many electric typewriters as desired for simultaneous operation, is the model ER Robotyper automatic typewriter, which was advertised by Robotyper Corporation of Detroit in the *New Equipment Digest* for January, 1947 (Vol. 12-No. 1). Measuring nineteen by twenty-six inches, the device is controlled by a perforated master record resembling a player piano roll, can be connected or disconnected in two minutes.

Thus by employing the vacuum principle one typist can do hundreds of individually typed letters, whose paragraphs can be removed and replaced, etc. every day. The recipient of such a letter can thus feel he alone received the letter addressed to him. Roll can be permanently filed for later use.

On September 11, 1947 George Coffey, fifty-nine-year-old tool machinist and home tinkerer, demonstrated his talking typewriter (self-named "Typovox") and said he had obtained a patent on it, the Associated Press reported.

It works through an arrangement of electrical contacts and phonograph recorder and reproducer and Coffey believes it will help blind persons learning to type. When, for example, the typist strikes "w", the machine promptly announces "doubleyou." It repeats the name of whatever letter or number key is struck.

The inventor first got the idea in 1917 but didn't begin to work on it seriously till 1937. He claims the principle can also be applied to adding machines and cash registers.

Given a few days, the New York linguistic scientist, Martin Tytell, can pull a typewriter apart and put it together again so it will write in any one of 147 foreign languages (not to mention all the Indian dialects), including Urdu, Dinka, Sanskrit, Cree and Persian. He has a stockpile of more than a million type faces.

Most ambitious project was his collaboration with the late ex-Senator Robert Owen in developing a global alphabet, a master alphabet combining the key sounds of all alphabets. Tytell has already installed the first global keyboard on a typewriter.

Chapter XIII

SHOLES DIES OF TUBERCULOSIS

Before this frail and gentle genius died of tuberculosis in his adopted Milwaukee Monday, February 17, 1890 at seventy-one, he must have realized at least a little what his practical writing machine was to mean to the world. Did he realize that it had already begun to contribute beyond measure to world progress — that it would give employment to millions, principally women? We are using his invention to say these things!

As he promised he had married Mary Jane McKinney, daughter of Jacob McKinney, at Green Bay February 4, 1841 (just before the Southport editorship) and was the father of ten children who lived, five boys, five girls; reportedly two died in infancy. Geyer says he lived — and *Judy* magazine adds “comfortably” but not with whom — with Mrs. Fortier in Milwaukee during the last years of his life. It is known she was with her father until he died and she married very late in life. Evidently both the McKinney and Sholes families moved to Green Bay from Danville, Pa. Rebecca Barber was the maiden name of Mary Jane’s mother, who was of Dutch descent.

According to the late Thomas Quigg, (1882-1954), Danville R.F.D. No. 1, Chris Sholes spent the entire summer of 1889 hereabouts and might have returned to Danville previously to that but not afterward. Although only six at the time Quigg remembered it well because it was in March of that year his folks moved into a stone house still standing and near his last home. It was also the

same year, he held, the Charles Diehls took up residence in the Sholes loghouse (although our research hereinbefore has it the latter "took possession August 7, 1880").

The late Albert Diehl and Tommy Quigg were neighborhood boy friends. Many days all that summer by way of re-living the scenes of his boyhood Sholes associated and visited with the boys, saw old friends and places. Perhaps as if anticipating death he wanted to experience again unforgettable yesterdays. He apparently stayed in a Danville hotel and traveled the four and a half miles from town in a hired rig believed owned and maybe driven by John H. Brugler, later the Geisinger hospital architect. But he would always walk one way; perhaps out today, in tomorrow.

So the boy who spied Sholes first as he walked or rode down the road those summer mornings would notify the other. And one or the other always watched faithfully as any lookout, for didn't Sholes always give them long-stick candy? Besides, they liked the old man — and, strangely, his fatherly advice. To them his wise guidance was acceptable.

There seems to be little doubt this man was the inventor: tall, thin, with long, white hair, he appeared not to be robust. He wore a long swallow-tail coat.

If Lillian was perhaps the most prominent of his children, some others were by no means unimportant: Zalmon G. Sholes, who died in 1917 (maybe on October 9) produced the "Zalsho" typewriter. It was also called the Acme, the Sholes, Sholes Visible, and the Z. G. Sholes typewriter. He was the inventor of the front-stroke, visible, four-bank machine; Fred, later of Chicago, also became an inventor, designing some features which went into the making of typewriters, lived until 1935; Louis, an elder son of Christopher and inventor of the Sholes Visible of 1909, was a

practical printer in Milwaukee where Charles also lived. Charles was a compositor on the old Milwaukee *Daily News* and was said to be quite a gay young blade. The former died in 1914, Charles in 1902.

Kate became Mrs. Terral, moved to Racine, and died in Chicago August 5, 1896. Miss Jessie died in Pasadena March 16, 1898, Budd in Colorado four years earlier. Bess (Mrs. Elizabeth Gilmore) died in 1939; Cass died in Chicago November 8, 1926. Two other children passed away in infancy, making a total of twelve.

Practically the same Zalmon G. Sholes Visible made an earlier appearance in 1901 and the interesting thing about it is that toward its production Christopher is said to have contributed his last productive effort. It also was called the "Meiselbach", being put out by Meiselbach Typewriter Company of Kenosha, Wisconsin.

Speaking of a visible machine, the story is told of a western rancher in the early period who delivered a train-load of cattle to an eastern city stockyard and his work done, went to a large office building presumably to collect his check. There he watched for a spell a girl operating a crude typewriter. From time to time she had to stop and turn up the paper in order to see what she had just written.

"Wouldn't yuh think some fella would invent a roller so yuh could see what you were writin'?" he drawled.

The girl agreed it was a good idea but she was sure it had never been done. Nevertheless, next time the typewriter salesman came around she asked him about it.

He too thought it a practical suggestion and told the factory officials who put their engineers to work on it. But, alas, after some time the salesman had to report back to the "operator" the whole thing had proved to be quite impossible.

Meanwhile, however, the rancher, not knowing it was "impossible," had gone ahead, and out of a rough piece of wood and with only a pocket knife, fashioned the first, if crude, visible platen!

So or not, as its name inferred, the Sholes Visible showed not only the line being written but all that was written. Its typebars were each in a single unjointed piece, L-shaped, operated in a guide from the instant of pressing a key till its type impressed the paper. In fewness of parts, perfection of alignment, durability, this machine was distinctly superior to any model from his father's hands.

But it is interesting to remember his father had this visible feature in mind from the beginning, for his very first w-model had the glass top through which one could watch it write. However, Franz X. Wagner is credited with the first visible widely sold to the public. John T. Underwood bought it, gave it his name, started manufacture 1894-95. Christopher's last patent was granted August 27, 1878.

Said the Associated Press in its Sholes obituary of February 18, 1890 (as copied from *The Danville Gem* newspaper of Saturday, February 22, 1890 issue) :

"Christopher Latham Sholes, one of the early settlers of Wisconsin, and one of the best known citizens of Milwaukee died yesterday (Monday, February 17, 1890), aged about seventy-one. He gained National reputation as the inventor of the first successful typewriter. He was one of the earliest of Western newspapermen, and had been a state senator, member of the assembly, a collector of this port (Milwaukee), a postmaster at Kenosha (formerly Southport) and Milwaukee, and a member of the board of public works of this city. For three years Mr. Sholes was unable to leave his bed, but in that time he perfected a new typewrit-

ing machine. (This probably refers to the first Sholes Visible mentioned above, which didn't appear until 1901.) His disease was slow consumption, and for weeks his death had been expected."

Strain had told on his naturally frail frame and constitution. Actually he spent the last fourteen years in search of health, though he continued to work on inventions even when he was too weak to be about. His wife was not at his bedside for she died, also in Milwaukee, January 9, 1888. Five sons and five daughters survived.

He was buried in Forest Home cemetery, Milwaukee, and for all we know it remains still unmarked and unnamed as it was pictured to be in 1918 by Charles Weller in his *The Early History Of The Typewriter*, except for the four corner markers traditionally provided by the cemetery association, although when he was asked about it in July, 1946 M. C. Wittenberg said he assumed the grave had the usual family monument or marker but he had "no accurate knowledge on the subject."

In 1923 aging "Charlie" Weller was the leading spirit in a movement instituted by the National Shorthand Reporters' Association to mark this last resting place with a monument worthy of the name and fame of one of the world's great inventors. "The C. Latham Sholes Monument Commission" was to raise the necessary funds.

It was hoped it would be completed that year so that it would commemorate the fiftieth anniversary of the writing machine. But as of November 28, 1944 the cast in the museum at the Milwaukee court house had never been made into bronze as planned, according to information from Mr. Wittenberg.

Tall and slablike, the monument shows several girls' faces in front of whom is the full-length figure of one stepping

forth, as she faces a left full profile of the inventor, to accept her emancipated place in the business world.

William L. James, Chicago, remembering the suggestion at the previous annual convention to erect a suitable monument over Sholes' grave, at the nineteenth annual convention of the national association meeting in Cleveland August 13, 1917, introduced the resolution that created the Sholes Monument Commission. The motion was seconded and unanimously carried. It stipulated no fewer than three nor more than five persons be appointed to select others who would devise methods of soliciting nominal contributions toward the cast of a monument to be erected during the anniversary birthyear of 1923.

The first land the county bought for a park was a tract west of the Wisconsin Avenue viaduct called Sholes Park, now Jacobus Park. The new park is at Highway 100 near Muirdale Sanatorium, but it has never been developed. This is where the monument would go if it were completed and the property developed.

Chapter XIV

POSTLUDE

It was probably a little short-sightedness and much indebtedness that caused Sholes to sell for \$12,000. His life evidently was attended by the poverty and want, probably not tragic though, which has been the lot of numberless men of genius. But could he have foreseen that in twentieth century *uncivilized* warfare every bomber would carry a typewriter, each battleship of the active squadrons fifty-nine, each cruiser thirty-five — the number in the average editorial room? Aircraft carriers in action now use fifty-five. A destroyer can manage with seven.

In the Navy typewriters are truly in the service of everything afloat. Hence their need on a modern battleship, for instance, can be visualized and understood, for as Admiral Ernest J. King has said, it "is virtually a floating industrial city in itself." (Typewriters played a major part in World War I's victory too. As for their rôle in atomic-age warfare, who could say?)

"On shore vast batteries of typewriters pound furiously in the beehive of the Navy Department offices." Likewise thousands of machines are on the firing lines and in the operational offices of the air and ground forces. "The number of typewriters in action is several times as great as all forms of weapons used against the enemy," said *Sunbury* (Pa.) *Daily Item* in 1943.

The United States Army alone needs in wartime a million typewriters, never got them as long as the war lasted, so far as can be ascertained. Yet Commentator Earl Godwin

on Armistice Day, 1943 reported the finding of 30,000 "in a place where they were not needed!" It "uses them in every phase of its operations, in the field and behind the lines, for vital records, orders, dispatches and reports" as the *Saturday Evening Post* in its April 3, 1943 issue pointed out.

One way to help raise this required figure was to eliminate junior-high typing classes and continue them only in commercial courses, a suggestion carried out in Pennsylvania schools. (That typing is popular with students is shown by the fact that with the exception of geometry and American history, with 17% of all students enrolled in high school in 1930 typing was the most popular subject.)

This needed figure represented rock-bottom estimated requirements of our expanding war machine, or roughly one out of every four Standard models of 1935 vintage or later at that time in the hands of the American public. Thus during wartime public hands held some 2,400,000 such machines. This need was kept before the public by such cryptic announcements as the following, stamped in red on the face of a Royal company envelope: "Our fighting men need 25% of your typewriters — sell them today through your nearest WPB office."

Older machines were unwanted because they were too subject to breakdowns in the field and required an extensive repair setup. However, owners of pre-1935 models or portables were in a position to render the government great and patriotic assistance, the *Post* further pointed out, by renting, lending, or selling outright to business establishments which then could release their newer models to this important war cause. For the campaign was always short of its mark, while the need grew more urgent than ever. To help, owners of home typewriters were urged "to turn them in direct at

almost any typewriter dealer's NOW! It's not a gift. Manufacturers' trade-in rates of February 1, 1941 — thirty dollars for a four-year-old model, for example, obtain."

Certainly "the day will come when the typewriter's utility in the home will be universally recognized. It will render obsolete the schoolroom copybook for the child in learning his first lessons." When production of typewriters reached a million, half were portables, to show its expanding use in home, school, plane, train, and ship. And the future will no doubt be more wonderful than anything we have yet known.

It is a truly great industry itself that has developed since Mill's first recorded invention, the serious start in 1873, the part played by Matthew Boulton to James Watt toward building typewriters for commercial use, and truly great also are the many and ramified activities dependent upon it. "Of indispensable value," maintains *Geyer's Topics*.

Said a Remington company advertisement in the Geyer encyclopedia, "The first practical typewriter was destined to revolutionize business, free the world from pen slavery, and complete the economic emancipation of womankind. Unknown in business offices in 1871, American women are today represented by about a million typists, secretaries, and stenographers. The figure in Great Britain alone is over a half million.

"No other machine, no other invention, no other article of commerce of any kind has ever played a more commanding rôle in the shaping of business and social destiny." It is "the great-grandfather of all office machinery." No article of commerce is more universally distributed. "The idea which it embodied has directly inspired many subsequent inventions in the same field, all of which have helped to lighten the burden of the world's numberless tasks," said

the Herkimer story, adding that many improvements have been directly suggested and inspired by the writing machine.

It is constantly being altered and bettered, as for example the electric feature addition. Today's typewriter has more than 2,000 parts. Assembly of one involves around 5,000 separate operations. Its great, outstanding merit has always been its time-saving service. But it is a clerical labor saver and a brain saver too. Without the typewriter shorthand, those mysterious "pothooks" of Isaac Pitman, would have been limited in its usefulness. Indeed the typewriter perfected the process which shorthand had begun; it completely emancipated the executive.

It inspired inventors to make shorthand typewriters with about a dozen keys that abbreviate words or type characters representing whole words. (Such notes must still be transcribed.) It revolutionized business, injected new life into it, created new business, but has come to be used as well for every kind of personal writing.

While we may often have proudly boasted of the universality of the English language we may not have reflected that one of the most important causes of this spread has been the writing machine. The direct proportion of the distribution of typewriters to the worldwide adoption of the English tongue is no mere coincidence. Thus the typewriter not only facilitated the use of language but determined its universal spread as well. "The exchange of the typed word, which Sholes' invention made possible, helps the world to be more friendly," said Hilda Clark Fairchild.

One of the nineteen inventions generally considered greatest in modern times, the typewriter has won for itself an indispensable place in the world's work. It surely proved to be "a machine to supersede the pen," as the first type-written catalog prophesied, having then as now — only

more so — the advantage of “legibility, rapidity, ease, convenience, and economy.” Truly Pioneer Sholes developed a practical machine which became a new commercial product — a new industry.

The production of modern stenographers and typists is today increased ten times over due to the introduction of automatized typewriters.

One new machine turns out “stock” paragraphs for routine and duplicated correspondence. With electricity as the motive power these neverchanging passages are recorded on rolls like those used on player pianos. By simply pressing buttons the operator can select paragraphs in desired combinations which are then flawlessly impressed on the paper.

Next, there is the so-called “no-mistake” or “errorless” typewriter. Utilizing the linotype principle (with different sizes and kinds of type) it sets up an entire line at a time which can be previewed before actual printing through a front window to make sure of its accuracy. What’s more, this efficient, electrically powered Standard keyboard machine lines up perfectly even margins on both sides of the paper.

Of course the stenographer still has to be able to spell. If there are no mistakes, the line is printed in a single operation — by pressing one button. If an error is made, it is re-typed before being printed. In this case, the typist presses another button and the carriage is returned to its proper position. Then the error is deleted and substitution made. (On the conventional typewriter of course every letter is printed separately.)

It also has an automatic margin guard to apprise the typist as to how much writing space yet remains at the bottom of the paper. A new typewriter on the linotype principle that spaces words so that both margins are even

was also announced by the Underwood corporation March 20, 1949.

Then there is the electric typewriter with a perforating machine attachment called "flexowriter," designed for typists who must turn out many copies of a given letter. As a letter is typed, it is recorded by perforations on a tape. When the latter is fed back the letter is typed automatically. And the tape can be fed through again and again.

Letters can now be dictated on disc, film, wire, or paper tape. One type of equipment will record two-way telephone conversations.

Based on inventions by French scientist René Higonet and Louis Moyroud, an electronic typewriter that "photographs" lines of type on film was demonstrated at M.I.T. in Cambridge in the fall of 1949. The film in turn can be used to make a printing plate—all in a matter of five minutes.

This revolutionary new "typesetter" includes a mechanism with a "memory" which stores up letters until a complete line is set. Margins are evened and the line is photographed. When developed commercially the system is expected to make obsolete present metal-typesetting machines.

In 1957 the "speech typewriter" was announced. Laboratory men of a major electronics company that year developed an experimental machine which typed spoken words in conventional letters.

Called a "Dicto-Writer", this machine types directly from dictation with 80% accuracy.

Today we even have an electric portable.

Hal Boyle, the New York columnist, on July 28, 1958 wrote, "—typewriters now are manufactured to write in 147 different languages —"

The importance and far-reaching benefits of this "contraption" to the business, industrial, civilian, and military world cannot be overestimated. THE COMPACT TYPEWRITER OF TODAY IS SURELY A WEAPON OF WAR AND PEACE! !

BIBLIOGRAPHY

A Study of the Dvorak-Dealey Simplified Typewriter Keyboard and Teaching Typewriting in the Light of Recent Research by Gertrude C. Ford.

American Astrology Magazine, February 1948 issue. Pages 23-4: Article, *Christopher Sholes* by Hilda Clark Fairchild.

American Biography (1901) by Thomas William Herringshaw. Chicago: The American Publishers' Association, Page 846.

American Mechanical Dictionary, Volume III (1882) by Edward H. Knight. Boston: Houghton, Mifflin and Company, Page 2677.

America's Greatest Inventors (1943) by John C. Patterson. New York: Thomas Y. Crowell Company.

Badger Paper Mills, Inc., Peshtigo, Wisconsin. Vol. 2, Issue No. 5, Pages 32-3. Reprint of "Ideas That Built America No. 4", one of the corporation's regularly issued business circulars.

Builders of the Keystone State (1936) by Herman S. Alshouse. Illustrations by Alden Turner. Harrisburg, Pa.: The Telegraph Press, Pages 132-4.

Business Week magazine. Reprint of October 16, 1943 issue.

Chronicles of Central Pennsylvania (1944) by Frederic A. Godcharles, Litt. D. Vols. I to IV.

Compton's (F. E.) Pictured Encyclopedia and Fact Index, Chicago. Volume 14, Page 175; Volume 13, Page 391; Vol. B, Page 157.

Coronet magazine, January, 1948. "His Typewriters Talk Any Language" Vol. 23, No. 3, Pages 75-8.

Correspondence with Family, U. S. National Museum.

Daily Stories of Pennsylvania (1924) by Frederic A. Godcharles, Litt. D. Chicago: The Hammond Press, Pages 118-20.

Dictionary of American Biography, Volume XVII. Edited by Dumas Malone. Scribners, Pages 122-3.

Early History of the Typewriter, The, (1918) by Charles E. Weller. La Porte, Indiana: Chase and Shepherd, printers.

Encyclopedia Britannica (1910). Volume 27, Pages 501-2.

Fortune magazine, April 1945 issue. Page 227 (Remington Rand advertisement).

History of the Typewriter, The. Remington Rand, Inc.

Home and School Work, The (1915, 1923). Vol. 7, Pages 2,950-51: Chicago, Toronto: Perpetual Encyclopedia Corp.

Judy's Magazine, July, 1943. "The World's Most Unknown Inventor".

Leading American Inventors (1912) by George Iles. New York: Henry Holt and Company, Pages 315-337.

Modern Wonder Workers. A Popular History of American Invention (1924). Edited by Waldemar Kaempfert. Vol-

ume I. New York: Charles Scribner's Sons, Chap. II.
"Writing by Machine", Pages 262-86, by James H. Collins.

Nation's Business Magazine, November, 1946: "Mighty
Battle of the Pens" by Don Wharton, Page 53, etc.

New York Times Book Review, The. Issue of October 28,
1945.

Obituary of Sholes in Milwaukee *Sentinel* newspaper, Feb-
ruary 18, 1890.

*Pennsylvania Political, Governmental, Military, and Civil
Volumes* (1933) *Governmental Volume (III)* by Frederic
A. Godcharles, Litt. D. New York: The American His-
torical Society, Inc., Page 331.

Pertinent Information Re The Simplified Keyboard by
August Dvorak.

Philadelphia Record newspaper, The. Wednesday, June 23,
1943.

Potter (County, Pa.) Enterprise. Issue of Thursday, No-
vember 5, 1942.

*Proceedings of the National Office Management Associa-
tion* (1938). Nineteenth Annual Conference, Montreal,
June 6, 7, 8.

Scott's Scrap Book by R. J. Scott. King Features Syndicate,
Inc., February 15, 1944; June 26, 1944; October 30, 1944.

Simplified Typewriter Keyboard, The, by August Dvorak.
Reprint from the National Contest Journal, October, 1941.

Standard Dictionary of Facts, The, (1910). Edited by
Henry W. Ruoff, M. A., D. C. L. Pub. by The Frontier
Press Co., Buffalo, N. Y.

Story of the Typewriter, The, by Howard Blackman. Adapted for radio or assembly performance by Remington Rand, Inc.

Story of the Typewriter, The, (1873-1923) by the Herkimer County (N. Y.) Historical Society.

Story of the Invention of the Typewriter (1925) by H. W. Roby. Edited by M. M. Quaife.

The Danville Gem newspaper (AP story). Issue of February 22, 1890.

The History and Development of Typewriters (1938) by G. Tilghman Richards. London: His Majesty's Stationery Office.

The Peirceanian, February, 1942: Peirce School, Philadelphia, Pa.

The \$30,000 Bequest and Other Stories (1872, etc.) by Samuel L. Clemens (Mark Twain): "The First Writing-Machines", Pages 224-9.

The Typewriter, A Short History on its 75th Anniversary by John A. Zellers, Vice-President of Remington Rand, Inc.

The Typewriter; History and Encyclopedia. Reprinted edition from October, 1923 issue *Typewriter Topics* magazine. With addenda. New York: Geyer's Stationer.

Those Were the Days. Duell, Sloan and Pearce, New York: 1943.

Time, The Weekly Newsmagazine, March 20, 1939, Page 39.

Webster's Biographical Dictionary, First Edition (1943). Springfield, Mass.: G. & C. Merriam Co.

World Almanac and Book of Facts, The (1948).

